

THE DETERMINANTS OF AUDIT FEES
AN ANALYTICAL STUDY

WAFAA ABDEL MAGID RAMZY

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ABSTRACT

This study investigates the factors affecting the level of audit fees paid by companies to their auditors. Firstly, all the likely factors thought to be affecting the level of audit fees were identified through a literature survey. These factors were classified into three groups i.e., size, complexity, and others. The relative importance of these factors was determined empirically and statistically. The empirical study was undertaken by mailing two questionnaires to samples of 100 companies, and 100 audit firms.

Preliminary interviews were carried out in order to identify if the most important factors collected through the literature should be considered suitable for further inclusion in the final questionnaire. The questionnaires were not used to collect data or to quantify the subjective factors. They were used to assess the degree to which the factors previously identified were important determinants of the audit fee, and whether other determinants should also be considered. The data for the statistical analysis was obtained from published data i.e., Data Stream, Companies' Annual Reports, and Who Owns Whom. In carrying out the statistical analysis, Multiple Regression and Principal Component Techniques were used to assess the magnitude of the association between the size and complexity factors and audit fees. An audit fee regression model was developed which explains 90% of the variation in audit fees of the largest 65 manufacturing companies in the U.K. on the basis of their size and complexity.

The results of both the empirical study, and the statistical analysis revealed that the company size (in terms of debtors, stocks & work in progress, turnover, creditors, and total employment costs), and its

complexity (in terms of number of subsidiaries, and number of countries in which the company operates) are the major objective determinants of audit fees. The empirical study also revealed that the quality of the company's internal control system, competition in the audit market, and the risk involved in the audit work are the major subjective determinants of audit fees. In addition, the statistical analysis revealed that the factors debtors, number of subsidiaries, and total employment costs are the most significant predictors of audit fees, and the audit fee model which involves these three factors explains 92% of the variation in audit fees.

LIST OF ABBREVIATIONS:

General abbreviations:

AR	=	Auditors remuneration (audit fees)
CR	=	Creditors
DE	=	Debtors
SA	=	Sales turnover
ST	=	Stocks & work in progress
EMC	=	Employment costs
SUB	=	Number of the company's principal subsidiaries
CO	=	Number of countries in which the company operates
AICPA	=	American Institute of Certified Public Accountants
ICAEW	=	Institute of Chartered Accountants in England and Wales
ICAS	=	Institute of Chartered Accountants of Scotland
IFAC	=	International Federation of Accountants

Statistical abbreviations:

OLS	=	Ordinary least square
R^2	=	The proportion of the variation of the dependent variable (about its mean) which is explained by the independent variables
SSreg	=	Sum of squared errors explained by regression
SSres	=	Unexplained Sum of squared residuals

INTRODUCTION

Introduction:

The external audit services and audit fees paid by companies to their auditors are obviously of interest to both companies and auditors, companies are statutorily required to have their accounts audited and want the fees they pay to be reasonable, auditors provide such services and want to ensure that the fees they charge are sufficient to enable a satisfactory service to be provided. In addition to companies and auditors the public in general and shareholders in particular are concerned that the audit fee is not set of such a level - either too high or too low - that it might undermine confidence in the audit opinion.

Generally, the external audit fee has four basic aspects i.e., determining the fee, selling the fee, billing the fee, and collecting the fee, Zweig 1978¹⁰⁰. The present study is concerned with the first aspect i.e., the determination of audit fees. The most common method of determining the audit fee is based on the time involved in the audit work (i.e., the hourly or daily rate basis). Such time is, of course, a function of other factors.

This study focuses on the identification of the factors that enter into the determination of audit fees, factors which may affect directly the time of the audit work or indirectly the level of audit fees.

Objectives of the research:

The main objectives of the research are:

1. To identify the factors associated with the level of the annual audit fee.
2. To determine the magnitude of their association with the audit fee.

3. To develop an audit fee model to assess the variation in the audit fees paid by the largest 65 manufacturing companies in the U.K.

Research hypothesis:

1. It is expected that certain size factors (e.g., sales turnover) and complexity factors (e.g., number of principal subsidiaries) are positively related to audit fees.
2. The size factors are expected to exhibit economies of scale i.e., as the company gets bigger as measured by these factors, the audit fee gets proportionally lower.
3. Complexity factors are not expected to exhibit the same degree of economies of scale as size factors. The nature of complexity factors is such that with some factors e.g., number of subsidiaries, the audit problems associated with these may increase as the number increases. Similarly, a company with a number of subsidiaries in one country may display a different structure from a company with a number of subsidiaries in various countries.

Research limitations:

The market for audit services broadly consists of two major kinds of services, auditing or routine audit work, and other services or non audit work such as, accounting, taxation, and management consultancy services. Such services are beyond the scope of this study as they require different types of skills and experience, and may entail different bases for determining their fees. Therefore, this study focuses only on the routine audit services rendered annually by auditors to companies.

Initial audit engagements are excluded from the study. In such engagements the audit fee may not always reflect the normal fee to be charged, because of the unfamiliarity of auditors with the companies' operations in the first year. For example, audit fees could be underestimated, due to e.g., the existence of a major problem which was not envisaged during the planning stages, or a mistake in the assessment of such a problem. On the other hand, the audit fee could be overestimated, because in this year auditors expect to spend more time and higher costs than the following years.

Therefore, auditors are advised by an ethical statement issued by the Institute of Chartered Accountants in England & Wales ICAEW 1985, Section 1.3 "Remuneration", paragraph 5³⁷, to avoid the fixing of audit fees (pre - arrangement fees) in the first year until one year's work has been performed.

Structure of the Thesis:

To achieve the study objectives the thesis is structured in the following manner:

Chapter one:

Highlights the main features of external audit services and audit fees. It includes the regulatory framework which governs them, the nature of the market for audit services, and the main composition of an audit fee.

Chapter two:

Reviews the previous work done concerning external audit fees. The literature was classified into firstly, studies on the estimation of the external audit fees, secondly, studies about the rapid rise in the audit fee (Reasons for the rise and methods of minimizing it) thirdly, studies which identified

some factors affecting the level of audit fees, and finally studies on the design of an audit fee model.

Chapter three:

Deals with the factors affecting audit fees, which are classified according to different criteria i.e., according to their impact on the audit fee, their nature, and their relation to the auditor and the auditee.

Chapter four:

Deals with the research methodology. It presents the process of data collection, sample selection, data definition, data classification, and the study analytical framework.

Chapter five:

Presents results and discussion of the empirical study i.e., it analyses the responses to the personal interviews, and to both companies' and audit firms' questionnaires.

Chapter six:

Presents results and discussion of the statistical analysis i.e., it discusses the findings of the preliminary statistical procedures, principal component analysis, and multiple regression analysis. It also presents comparison between the results of the empirical study and the statistical analysis.

Chapter seven:

Provides the study summary and findings.

CHAPTER ONE

CHAPTER ONE

THE MAIN FEATURES OF THE EXTERNAL AUDIT SERVICES AND AUDIT FEES

Introduction:

This chapter highlights the main features and characteristics of external audit services and audit fees in terms of the identification of the regulatory framework which governs them, the nature of the market for audit services, and the main composition of an audit fee.

The chapter is divided into the following sections:

- 1.1: The regulatory framework of the external audit function and audit fees.
- 1.2: The nature of the market for audit services.
- 1.3: The main composition of an audit fee.

1.1 The regulatory framework of the external audit function and audit fees:

The external audit function and audit fees are of interest to both the legal authorities and the professional accounting bodies. This section describes the regulatory framework by reviewing some of the important legislation and guidelines of the professional accounting bodies which govern them.

Some important legislation:

The legal authorities devote much attention to the external audit function and audit fees. A number of provisions are laid down relating

to major matters such as, appointment, remuneration, removal and qualifications of auditors, and disclosure of fees:

The authority appointing the auditor and determining his fee:

The U.K. Companies Act 1985 section 384²⁹ stipulates that each general meeting of the company shall appoint an auditor and determine his fee until the next general meeting. If the auditor is appointed by the directors or by the Secretary of State (of the Department of Trade and Industry) his fee may be fixed by them.

Removal of auditors:

As in the case of appointing the auditor and determining his fee, a company may, by ordinary resolution, remove an auditor before the expiration of his period of office, notwithstanding anything in any agreement between it and him. These provisions are set out in section 386 of the 1985 of the U.K. Companies Act³⁰, and indicate the company's power, "as auditors usually operate in a buyers' market, where the companies choose the auditor, determine his employment conditions, and could also remove and replace him", Goldman 1974³¹.

The disclosure of audit fees:

The fourth Schedule of the U.K. Companies Act 1985, paragraph 53³¹ requires that the amount of the auditor's remuneration should be disclosed in the profit and loss account under a separate heading; and any sums paid by the company in respect of the auditors' expenses i.e., in connection with audit, should also be included in the expression Remuneration. Such provisions are stated to ensure that the remuneration paid to the auditor has the knowledge of the members. However the most important drawback is that "there is no clear legal

definition of the audit fee which is to be disclosed", Briston & Perks 1977¹¹.

Qualifications of auditors:

The qualifications for appointment as an auditor are set out in section 389 of the U.K. Companies Act 1985¹². It indicates that a person is not qualified for appointment as an auditor of a company unless either he is a member of a body of accountants established in the U.K., and recognised for the purposes of this provision by the Secretary of State (of the Department of Trade and Industry) or he is authorised by the Secretary of State to be appointed, as he has similar qualifications obtained outside the U.K., or because he retains authorization formerly granted under section 161 (1) of the Companies Act 1948 (adequate knowledge and experience, or pre 1947 practice). According to the provisions under the previous section 161 (1), all auditors should have equivalent qualifications and knowledge in order to enter the auditing profession. Therefore, it is deduced that the quality of the routine audit services could be similarly performed and satisfied by any qualified auditor.

Although the legal authorities have paid much attention to these previous aspects of auditing matters, the issue of identifying the factors which enter into fixing the audit fees has received no attention, and no attempt has been made to identify and publish official scale rates for audit fees. In addition, the regulation regarding the disclosure of audit fees may need to be revised to define precisely what has to be disclosed in the annual report and accounts.

Some important professional guidelines and restrictions :

The professional accounting bodies (both national and international) have laid down various ethical guidelines relating to the conduct of auditors. The following are some of these guidelines which were designed to draw the auditors' attention to important matters in the determination of their fees:

The basis of auditors' charge:

The Institute of Chartered Accountants in England and Wales ICAEW 1985, Section 1.3 "Remuneration", paragraph 1st indicates that in order to carry out professional services the auditor must first consider the instructions of his client in conjunction with any statutory duty relating thereto and then discharge his responsibility by applying to the affairs of his client the professional skill and knowledge which he and his staff have acquired by training and experience. His fee for that service should provide him with appropriate remuneration for the time and skill which he has personally devoted to his client's affairs and the responsibility he has accepted together with reimbursement of a suitable margin of profit on his overhead expenses and the salaries of his staff for whose work he takes responsibility. Fees should therefore normally be computed by reference to the (a) skill and knowledge required for the type of the work involved, (b) the seniority of the persons necessarily engaged on the work, (c) the time necessarily occupied by each person engaged on the work, and (d) the nature and degree of the responsibility which the work entails.

The International Federation of Accountants IFAC 1985, Section 12

Ethics, "Professional fees", paragraph 5⁴⁶ requires that professional fees should be a fair reflection of the value of the work performed for the client, taking into account the same factors mentioned above by the ICAEW.

Much of the work of a practising member is normally charged out on the basis of appropriate rates per hour or per day for the time of each person engaged on it. It is for the auditor to decide upon the appropriate rates and these will vary according to the nature of the services. ICAEW 1985, Section 1.3 "Remuneration", paragraph 2³⁷.

Similarly, the IFAC 1985, section 12 "Ethics"⁴⁷ states that fees should normally be computed on the basis of appropriate hourly or daily rates for principals, seniors and other staff. These rates should be based on the fundamental premise that the organization and conduct of the accountant's office and his client work are well planned, controlled, and managed. They should take into account the factors set out in paragraph 5 mentioned above, and will be influenced by the legal, social and economic conditions of each country. It also states that it is for the auditor to determine the appropriate rates.

According to these statements it is clear that the audit fee is a function of audit cost which in itself a function of the time and seniority (quality) of the staff involved in the audit work.

Preclusion of the charging of fees on percentage or contingency basis:

An ethical statement of the IFAC Handbook 1985, on Integrity, Objectivity, and Independence, "Contingency Fees"⁴⁸ states that Professional services should not be offered or rendered under an arrangement whereby no fee will be charged unless specified findings or results are obtained, or where the fee is otherwise contingent upon the findings or results of such services, and fees should not be regarded as being contingent if fixed by a court or other public authority".

In addition, a member in practice is not permitted to charge or accept a fee for professional work which is calculated on a percentage basis except where that course is authorized by statute or has been approved by a member body as generally accepted practice for certain work, IFAC 1987, Section 12 Ethics, "Professional fees", paragraph 11⁴⁹. Similarly, the ICAEW 1987, statement 9 - "Fees"⁴⁹ prohibits fees to be charged on a percentage or similar basis, or on a contingency basis.

Restricting auditors from certain activities which may impair their independence, integrity, threaten their objectivity, and which could lead them to be guilty of misconduct:

Auditors are restricted from obtaining or seeking professional work in an unprofessional manner ICAEW 1987, statement 3 - "Obtaining Professional Work"⁴¹. For example an auditor should not pay a commission to obtain a client nor should he accept a commission for referral of a client to a third party. He should not accept a commission for the referral of the products or services of others. IFAC 1985, Section 12 Ethics, "Commissions"⁵⁰. Such activities could impair the auditor's objectivity and independence.

Auditors should not accept a very low level of fee as a result of competing for business. The Code of Professional Ethics, Provision 502-14, rule 3.03 "Fees and Professional Statements"⁵⁵, prohibits competitive bidding which is considered as unprofessional conduct. Price competition is restricted and deplored in the profession, as it could impair the auditors' independence and deteriorate the quality of the auditing service. For example, the Accounting Series Release No. 250⁵⁷, provides the disclosure of fee arrangements when the accountant has agreed to a fee significantly less than a fee that would cover expected direct cost. However, "it is not improper for an auditor to charge a lower fee than has previously been charged by another accountant for similar work", provided it has been calculated in accordance with the factors referred to in paragraph 5 IFAC. IFAC 1985, Section 12 Ethics, "Professional Fees", paragraph 9⁵¹.

Conversely, accepting fees from a client or group of connected clients

which represent a large proportion of the total gross fee of an accountant in public practice or of the practice as a whole, may also raise doubts as to the auditors independence and objectivity. IFAC 1982, Section 12 Ethics on Integrity, objectivity, and independence, "Fees"⁴⁰.

An auditor should make sure that in general terms, fees from one client or a group of associated clients do not exceed 15 per cent of his gross fees, or in the case of an auditor in part time practice 15 per cent of his gross professional income. However, a newly established practice, whether full time or part time may well not be able to apply this. Such a regulation seeks to ensure that the auditor's independence does not appear to be impaired, ICAEW 1987, Section 1.2, Explanatory note to statement 1⁴¹.

A similar situation may arise if fees due from a client for professional services remain unpaid for an extended period of time, i.e., at the time a member issues a report on client's financial statements, the client should not be indebted to the auditor for more than one year's fees. This prohibition is based on the belief that such a receivable from the client gives the auditor an interest in the financial success of the client and might influence his independence in carrying out the examination. AICPA, Professional Standards, Ethics Ruling No. 52 on independence, integrity, and objectivity⁴², and IFAC 1982, Section 12 Ethics, "Fees"⁴³.

It could be concluded that the level of audit fees and how they are determined are significant matters to both national and international professional accounting bodies, which published the above statements to indicate the basis on which audit fees should be determined, the costs

which should be covered by an audit fee, and the factors which should be taken into account when determining the audit fee. In addition these statements were also designed to restrict auditors from charging their fees on a basis which might be incompatible with the ethical values associated with the audit profession. Consequently, they seek to protect the auditors from losing their objectivity, and effectiveness as independent auditors.

1.2 The nature of the market for audit services:

The market for accounting services broadly consists of two major kinds of services, auditing or routine audit work, and other services or non audit work such as accounting, taxation, and management consultancy services. This section is concerned with identifying the main features of the market for routine audit work, as the market for non audit services is beyond the scope of this study; however the impact of such services will not be ignored during this study. To identify the nature of the audit market, it is important first to briefly describe the main features of the demand and supply for such services.

The demand for and supply of audit services:

There are large numbers of clients who demand an annual audit service. Such services are compulsory for every registered company in the U.k. i.e., companies are required by the 1985 Companies Act section 384⁸⁹ to have their accounts audited by independent auditors. However, clients have the freedom to select their auditors. Like the demand for audit services, there are large numbers of suppliers offering these services; as the routine audit services can be supplied by any qualified and professionally trained auditor.

To some extent, there is price competition between the suppliers of such services in order to attract a client although it is deplored and restricted in the profession. Sometimes audit firms may submit a bid well under the normal range if they have a high proportion of their junior and senior accountants idle, just to get them working again. Also some firms often submit such bids in the hope that after they get a foot in the door, they can gradually expand the volume of their work and

their fees. Carmichael 1979¹³. An ethical rule of the IFAC 1985, Section 12 Ethics, "Professional fees"¹⁴, states that auditors should not make representation that specific professional services in current or future periods will be performed for either a stated fee, an estimated fee, or a fee range if it is likely at the time of the representation that such fees will be substantially increased and the prospective client is not advised of that likelihood.

According to the previous features of the demand and supply, the audit market could appear as a pure competitive market. However, investigation of the supply side indicates that the audit market has features and characteristics of an oligopolistic market particularly when looking at the statutory audit for public limited companies. "Oligopoly in its simplest form is found in an industry in which the competing firms (producing either close or perfect substitute outputs) are several, but are few enough and large enough so that each controls enough of the total industry output that a moderate extension of its output will reduce the sales of rival firms by a noticeable amount. This is definitely the case if from two or three up to perhaps two dozen firms control an entire industry output with each controlling enough to affect rivals by its output changes", Bain 1952¹⁵.

The audit market in the U.K. has similar characteristics to an oligopolistic market, as there is high degree of concentration of the supply of audit industry, which is dominated by a few big firms who control a significant proportion of the audit industry. Such big firms are strong enough to influence the price of the audit services. Briston's study "The U.K. Accountancy Profession — The move Towards Monopoly Power" 1979¹⁶, showed the extent of the concentration of power in the accounting profession in the U.K., and indicated that 51% of all

listed companies are audited by the top eight firms, and 69% by the top twenty.

In addition, there is non price competition in the audit market in the U.K. not only between the big and small firms, but also among the big firms themselves, who will compete with tools other than price e.g., industry specialization which is considered as an effective marketing tool by the big firms, as "over the years the big firms have become identified with certain industries for example, Ernst & Whinney and Peat Marwick, Michell with banks and insurance companies, Touche Ross with retailing, Coopers & Lybrand with mining and, Price Waterhouse with oil and steel, etc.", Bernstein 1978⁸. In addition, accounting firms will compete through practice development activities 'PD' (such as, civic or charitable activities - at the country club, on the Local United Fund Committee and so forth) to cultivate contacts with companies' directors who are instrumental in the ultimate selection of an auditor. Briston 1985⁹ criticised those large firms who are expanding their activities into such fields to the extent that audit work now probably constitutes only about half of their total income, and he also indicated that the problem with this extension of the activities is that the auditing and consultancy arms of these large firms are now inextricably mixed.

This section provides a general indication of the nature of the market for audit services. Issues such as price and non price competition, and degree of concentration are outwith the scope of this study and need to be investigated separately.

1.3 THE MAIN COMPOSITION OF AN AUDIT FEE:

The determination of an audit fee is a complex operation affected by a series of different factors. This section therefore, discusses the audit fee in terms of its main composition. The factors thought to affect such composition, and the level of audit fees in general are presented in chapter three.

Generally, the audit fee should cover audit costs and provide a reasonable profit. Therefore, the audit fee can be seen as a combination of two items i.e., (1) audit cost and (2) profit or auditors reward, as displayed in the following figure.

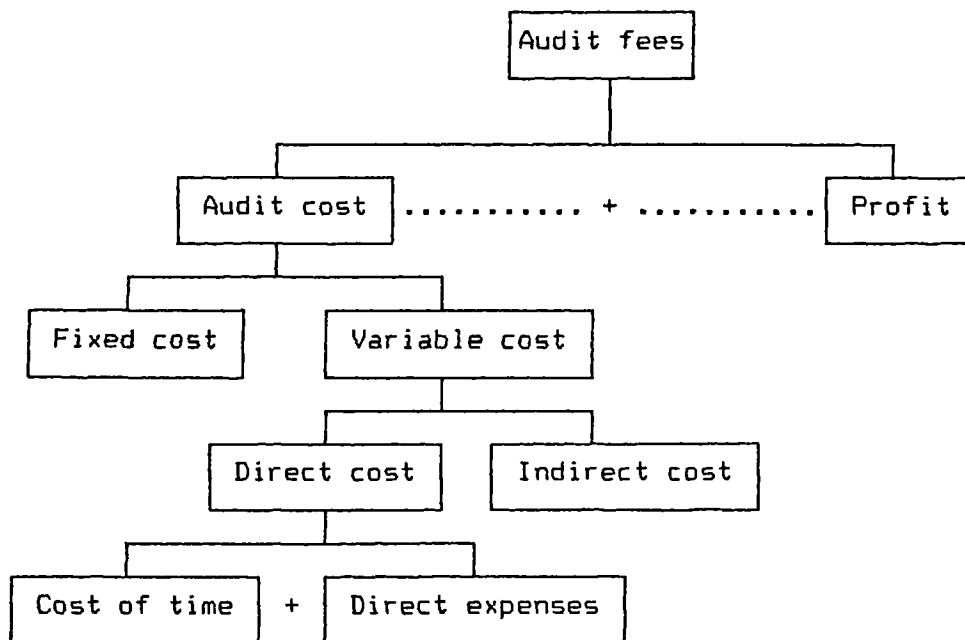


Figure 1.1

The main composition of the audit fee

(1) Audit cost: Generally, the cost of audit services rendered by auditors include two major kinds of costs i.e., fixed cost, and variable cost.

Fixed cost: Which will be incurred whatever the level of audit work, such as rent, equipment, insurance, wages of non audit staff, etc.

Variable cost: Which will vary according to the level of audit work. Such cost can be divided into direct cost, and indirect cost.

Direct audit cost: Which consists of the cost of time spent by the auditor and his staff in carrying out the audit work, plus other direct expenses related to the audit.

The cost of time: The time cost represents the major element in the cost of audit. It includes: Firstly, the cost of the staff time in carrying out the routine audit work. Such time is often priced on an hourly time rate basis. This method is adopted in both the U.K., and the U.S.A., where the cost can be calculated depending on the number of hours worked by the auditor's staff, according to certain appropriate rates per hour or per day of remuneration. Secondly, the cost of the time devoted by the auditor himself or by his partners in preparing for the audit work such as identifying the client's problems or difficulties. Morgan 1973⁶⁶ suggested that the auditor must allocate a reasonable "salary" to himself or to his partners as a basic cost in conducting the practice.

The direct expenses: In addition to the time cost, there are other expenses which are directly related to the engagement such as phone calls and travel expenses. Generally, such expenses, like the time

cost, should be covered completely by the audit fee, and will form part of it, even if billed separately. The Companies Act 1985⁷¹ requires that auditors remuneration should include any sums paid by the company in respect of the auditor's expenses, and related to the audit. Both the ICAEW 1985, Basis of members' charge, paragraph 8⁷², and the IFAC 1985 "Professional Fees", paragraph 8⁷³, state that out of pocket expenses, attributed directly to the work done for a client would normally be charged to that client in addition to the professional fees.

The indirect cost: There are other costs which are indirectly related to the engagement such as, stationery, depreciation of equipment, and telephones, but can not be directly identified with it. Generally, a reasonable proportion of such cost as well as the fixed cost should be covered by the audit fee. Morgan 1973⁴⁴ indicated that such costs (which he classified as overhead expenses) should be distributed among clients; he also indicated methods of allocating such cost such as, the hourly burden rates, which is derived from dividing the annual overhead expenses by the total number of hours charged to clients during the year by both staff and partners, and the basic time rates, where such expenses can be effectively met through the employment of basic time rates established in relation to the direct salary costs of the engagement, or direct salary and an allocation of the overhead.

(2) Profit (Auditors reward): The audit fee should cover the direct audit cost, reimburse the auditor for a fair proportion of both the indirect and fixed cost, and provide an amount of profit.

Therefore, it can be concluded that time is the basic starting point in determining audit cost. It is also considered a good base for fixing it, mainly because it is observable by clients, and accurately

measurable. The audit fee will seek to cover the time cost and will include an element to contribute both to indirect costs, fixed costs, and profit. The cost of time can be seen as a function of a number of factors, which will be identified through a review of the literature in the following chapter.

CHAPTER TWO

CHAPTER TWO

PREVIOUS RELATED STUDIES

A REVIEW OF THE LITERATURE

Introduction:

The literature of auditing devotes much attention to the external audit fees paid by companies to their auditors. The studies which have been undertaken have looked at different aspects of this issue. This chapter reviews these studies which can be classified as follows:

2.1: Studies on the estimation of the external audit fees.

2.2: Studies about the rapid rise in the external audit fees
(reasons for the rise and methods of minimizing it).

2.3: Studies identifying some factors which affect the level
of audit fees.

2.4: Studies on the design of an audit fee model.

2.1: Studies on the estimation of the external audit fees:

Briston and Perks 1977¹¹ estimated the total audit fees paid by all the 592,243 companies (3,555 listed companies & 588,688 unlisted companies, ranked by turnover) registered in England, Scotland, and Wales in 1975 to be around £200 million (£109.70 million for listed companies plus £90.0 million for unlisted companies) for 1975 / 1976, and £250 million during 1977. They used the average of the audit fees as a percentage of turnover (i.e., 0.1%) to estimate the total audit fees. Their study indicated that the proportion of audit fees to turnover decreases as the company's size increases e.g., audit fees as a percentage of turnover was 0.1% for the companies with total turnover £2.2 billion, and it

decreases to 0.04% for the companies with total turnover £69 billion.

Fanning 1978²⁷ also estimated the total audit fees of limited companies in the U.K. (top 100 quoted companies by market value, 500 other quoted companies, and 300,000 unlisted companies) in 1976 / 1977 to be £416 million (£54.42 million for the top 100 companies, £212.85 million for the other 500, and £148.75 million for the 300,000 unlisted companies). Additionally the estimated audit fees for 1978 was about £450 million assuming a continuing trend in fees increases between 15% and 30%. The following table 2.1 summarizes the results of the two studies.

Study by	Number of companies	Estimated fees
Briston & Perks (1977)	3,555 (Listed Cos.) 588,688 (Unlisted Cos.)	£109.7 m £90.0 m
		£200.0 m (1975/1976) & £250.0 m (1977)
Fanning (1978)	Top 100 (Listed Cos.) 500 (Listed Cos.) 300,000 (unlisted Cos.)	£54.42 m £212.85 m £148.75 m
		£416.02 m (1976/1977) & £450.00 m (1978)

Table 2.1

Estimation of audit fees in the U.K.

The estimated audit fees derived from the previous studies are not comparable, since different ranking basis were used in selecting the sampled companies (turnover & market value), and also different sample size. However, they gave an impression about the significant cost of

the external audit services to companies, and to society in general. They also drew attention to the issue of the annual increase in the level of audit fees.

2.2: Studies about the rapid rise in the external audit fees (Reasons for the rise and methods of controlling and minimizing it):

The annually increasing audit fees is another issue which has featured in the auditing literature. In his article "Auditors' Fees Start to Hurt" 1981, Jermy Stone⁹² indicated that audit fees have been going up faster than industry can afford, as since 1979 the companies had to "swallow" an average increase in the audit fees of more than 24%. Auditors attributed the rise in audit fees to the rising of their basic costs i.e., the salaries, and indicated that the root of the trouble is to be found in the labour market, where the shortage of qualified accountants has driven the price of labour steadily upwards. To hold the audit fees down the Hundred Group's report suggested the cost saving solution which means cutting down the amount of work an auditor would need to do, by controlling the length of time the auditor actually spends on his operations. In other words, the number of hours to be charged can often be reduced if companies take more of the work in house and make their accounts easy to audit. Unlike the auditors, finance directors have not welcomed this solution as they were aware of the hidden cost involved in making their accounts easy to audit.

In addition to the rapid rise of the external auditors' fees, inconsistencies in the level of fees paid by companies to their auditors have been highlighted. This issue has been raised by the publication of the "Audit Fee Guide", Bob Crew 1985¹⁹ which surveyed more than 12000 U.K. companies including 7,176 in the manufacturing sector, and revealed

that some companies, apparently similar, were paying eight times more than others for their audit work, and that some manufacturing companies were paying 56% more than distribution and services companies. A number of reasons were given for this such as, complexity of the companies (e.g., a company which has a history of debt complexity and its ledgers are not analyzed properly), different approaches of auditing i.e., spot checks which cost less rather than a thorough examination, location of the auditing firm i.e., provincial firms are cheaper than some of the fashionable London firms, state of development of the client businesses e.g., these which expand and become more inefficient need more work from the external auditors and finally, the grade of the staff involved or required. Generally, it was found that in the manufacturing sector audit work is often more time consuming and complicated owing to problems in some areas such as, work in progress and finished stocks.

It is not only in the U.K. that concern has been expressed about the rise in the external audit fees. American and Canadian companies have also complained that the audit fees have become unreasonably high according to Hobgood and Sciarrino 1977³⁴. In their survey of the 1,655 companies, they found that the average audit fees paid by U.S. manufacturing companies in 1971 was .04% of the annual sales, and for the Canadian manufacturing companies .02%. The companies accused the audit firms for assigning inexperienced audit staff, who frequently perform clerical functions but are paid at a professional rate for doing unimportant tasks which also waste their time. The auditors replied that a company can reduce the time required to perform the audit work if the management organised its internal auditing function properly and carefully planned its audit needs.

The time spent to finish the audit work in the U.K. was criticized by

Fanning 1978²⁷. He attributed the delay of releasing the audited results for publication to the lack of speed of the auditor. By examining the national differences in the average time lags he found that in general terms the British auditor performs at half the speed of his American counterpart.

In his article "Minimizing Audit Cost" 1978, Lurie²⁸ indicated that the time required by companies' personnel to provide the auditor with information and data represents a significant hidden audit cost which should be considered like any other factor which enters into the cost of the annual audit such as, size, complexity, computerization of the company, and efficiency of its accounting department. Lurie suggested that by planning the audit and budgeting for it audit cost can be reduced. Planning the audit was described as a joint venture in which top personnel from the company's staff and the audit firm participate to develop a preliminary plan which best starts shortly after the completion of the current year's audit to avoid any mistakes and problems which are still in the minds of all participants. The second or the final plan can be developed toward the end of the year on the basis of conditions then existing. Regarding budgeting for the audit, the auditor prepares his budget with details of the portion of total audit fees attributed to each subsidiary, division or subdivision of the company (sometimes it could be analysed by the various categories such as, balance sheet, profit and loss accounts and tax return), based upon personnel hours rates for staff classifications and out of pocket expenses. Finally, by depending on such a budget, management could find that economies could be made by determining that work previously done by the auditor could be handled by the company.

2.3: Studies identified some factors which affect the level of audit fees:

There have been several investigations into the factors affecting the level of the external audit fees. Hobgood and Sciarrino 1972³⁴ listed a number of factors which were often mentioned by the respondents of their survey of 1,655 U.S. and Canadian companies as being used in judging the current audit fees. These factors were: comparison of hourly rates paid to internal audit staff, comparison of CPA fees currently paid with those of other consultants, comparison of CPA fees currently paid with those paid by the company in the past, size and calibre of the audit firm staff, size of company and location of its audited units currently and in the previous years, scope of the audit as compared with the scope of previous audits, relation of audit fees to sales size, comparison of audit fees paid with those paid by other companies of similar size in the same industry, and comparison of fees budgeted and fees actually paid to the CPA firm.

Two investigations into the objective and subjective elements in a fee were made by Morgan. In his first study "The objective elements in a fee" 1973³⁴, he indicated that time is the major objective element in the cost of the routine audit engagements. However, in his opinion when the engagement involves specialised ability, the weight given to the time factor is less than for a routine audit engagement. In his second study "The subjective elements in a fee" 1974³⁵, he suggested that the actual time spent in the audit work does not necessarily provide a basis for the fee in many instances, as the time spent gives no indication of the value of the service rendered. He indicated that such value of service is closely related to the skill and experience of the staff

required to perform the work.' In seeking a fair gauge of value, the various levels of the work should be matched to the appropriate skill of the individual staff involved.

In addition, some other subjective elements in a fee were also mentioned such as, the technical importance of the work, and the extent of responsibility which was related to some factors i.e., degree of work performed (routine or non routine auditing work), adequacy of the records on which the work was based, intended uses of the reports rendered, amounts involved, obligations or responsibilities imposed by governmental regulations, and liability of the auditor to third parties. Value of the service to the client was another subjective element which was closely related to the company's ability to pay. Some factors were considered in estimating the value of the service to the client i.e., the intrinsic value of the work performed to the client, the degree of success in attaining the purposes for which the work was required, and the purpose itself. Finally, he indicated that difficulty of the engagement, special consideration for inconvenience might also play a role in the determination of the audit fees.

David Steele 1976⁸¹ indicated that for the greater part of general auditing practice time rates play the dominant part in fixing the audit fees. However there are other "intangible" factors which should be taken into account when determining the audit fees such as, first: the skills and knowledge required for the type of work involved, which go into the satisfactory performance of the audit work, second: the degree of responsibility i.e., for the highly responsible work auditors should charge higher fees, third: the value of the work to the client i.e., if the client regards the job of special importance he must expect a bill which reflect this importance. Finally, he believed that a single time

scale applicable to all normal types of work, which takes into account these intangible factors is the only satisfactory basis for evaluating audit fees. In other words, he suggested by converting salary rates into hourly or daily rates (considering that there are 1,400-1,500 hours per year according to experience) i.e., a daily rate of £1 per cent of annual salary for employees together with appropriate higher rates for partners' time provided a fair basis for evaluation of fees for normal audit work.

Zweig 1978¹⁰⁰ indicated that the value of the service must be the basic element of the fee determination. Therefore, she suggested that value and time should be interrelated by applying different billing rates depend on the grade of the person performing the service i.e., the person who analyses the overall situation and seeks better methods to increase profits is worth a higher billing rate (for his creative and imaginative thinking backed by continuing education) than the accountant who is just a good technician.

Flesher and Soroosh 1980²⁵ specified nine factors that played a role in the determination of audit fees. Time spent on the job and the cost of the service rendered represented the objective element in a fee, and ability of client to pay, value of the service rendered, customary fees, legal limitations, established client, contingent or fixed fees, and urgency for work to be completed represented the subjective elements. They conducted a survey of 232 CPAs (randomly selected from the AICPA membership). The results of 105 received responses indicated that 0.9% and 8.6% of the respondents strongly and mildly agreed respectively that time spent was usually a determinant of the price they charged, but 53.3% and 28.6% of the participants strongly and mildly agreed respectively that time spent was always a determinant in a fee.

Regarding the cost of the service rendered 74.3% and 22% of the respondents strongly and mildly agreed respectively that the cost should be an element of prices charged to clients.

The survey also revealed that only a minority of respondents 15.2% strongly agreed, and 51.4% mildly agreed that ability of the client to pay is a factor when billing for the service. 79% of the CPAs agreed that they occasionally base the price of their service partly on the significance of the services to the client, but only 43.75 of the respondents strongly agreed that they would charge lower fees for services that have little or no value to the client, even though the service may be well performed.

From the participants in the study 67.6% mildly agreed while only 22.9% disagreed that previous fees were determinants of current fees. The survey showed that 15.3% and 44.7% strongly and mildly agreed respectively that customer status is considered in fee determination. The majority of participants 36.2% and 17.1% strongly and mildly disagreed that contingency was a determinant in their fees. Finally, regarding the urgency with which the work is to be completed 59% of the respondents agreed that they would charge a lower fees if they could perform the service when they are less busy.

Generally, according to the majority of the respondents it could be concluded that they strongly agreed that the time, cost, and the value of the service to the client are important factors, whereas they mildly agreed that the factors i.e., ability of client to pay, customary and previous fees, the status of the client, legal limitation and the urgency of service are factors in fee determination.

The following table summerizes all the factors mentioned in the above studies.

Study by Year Country	Factors affecting audit fees:
Hobgood & Sciarrino (1972) U.S.A	Size and calibre of audit staff Size of company and location of its audited units Comparison of current and previous fee Scope of the audit as compared with previous audits Comparison of hourly rate paid to the internal audit staff Current fees as compared with those paid by other Companies of similar size in the same industry
Morgan (1973) U.S.A	Time
Morgan & Ombler (1974) U.S.A	Value of services rendered / skills and experience of audit staff / technical importance of the work / value of the service to the client / companies ability to pay / difficulty of the engagement / special consideration to a new client / size and characteristic of the community / extra compensation for inconvenience
Steele (1976) U.K.	Time / skills & knowledge required for the type of the work involved / degree of responsibility / the value of the work to the client
Zweig (1978) U.S.A	Value of the service rendered
Flesher & Soroosh (1980) U.S.A	Time spent on job / cost of service rendered / ability of client to pay / value of service rendered customary fees / legal limitations / established client / contingent or fixed fees / urgency for work to be completed

Table 2.2

Factors affecting audit fees
(Literature review)

From the above table 2.2, it could be concluded that the time spent in the audit work is the major factor affecting the audit fee. However, the determination of audit fees is a highly subjective process as it is affected by number of subjective factors. In addition to the factors mentioned above, a number of other factors were also specified as determinants of audit fees in the following studies. These studies included such factors as explanatory variables when developing the audit fee models.

2.4: Studies on the design of an audit fee model:

There have been number of studies which attempted to develop audit fee models using various factors to explain the variation in the level of audit fees paid by companies to their auditors. An empirical study was undertaken in the United States by Elliot & Korpi 1978²⁵, who drew their sample from the clients of their firm (Peat Marwick, Mitchell & Co.). A questionnaire was designed to collect the data and to quantify some of the qualitative variables. To develop their predictive audit fee model (of 60 manufacturing companies and 42 financial companies) they examined a number of factors i.e., the size variable in terms of size of sales which was found as a reliable indicator for size in manufacturing companies, and size of assets for financial companies, degree of the complexity of the company which ranges from 1 for a centralized, one product, one location company to 10 for a decentralized, multiproduct, multinational company. The square root transformation was applied to sales, assets, and complexity in order to linearize their relationship with audit fees. Other factors were also used, the percentage realization of standard fees (i.e., the ratio of actual to standard fees), the percentage reduction in audit scope due to the reliance on the internal auditors (i.e., 1 - % reduction), and number of the

additional audit report in excess of one (i.e., No. of reports - 1). The dependent variable in the sample was multiplied by a constant or a random number to protect the confidentiality of the fee structure. It was found that the developed audit fee models were statistically significant and were able to explain 94% and 84% of the audit fee variance for manufacturing and financial companies respectively. In both models the intercept values were not significant therefore they specified zero intercept. Finally, Elliot & Korpi gave an example to illustrate how their model could be applied.

United States data was also used by Simunic 1980⁷⁷ to develop his audit fee models which were mainly designed to test for price competition in the market for the audit of public companies. The data was obtained by a questionnaire survey. Simunic suggested three groups of explanatory variables which affected the audit fees i.e., variables control for differences in loss exposure, variables control for loss sharing ratio, and variables control for differences in auditor production function.

The variables which control for differences in loss exposure were represented by size of the company as measured by total assets, the complexity of the company's operations i.e., the decentralization and the diversification of the financial reporting entity. Decentralization was measured by the number of the company's consolidated subsidiaries SUBS, and the diversification was measured by two items the number of two-digit SIC (standard industrial classification) industries in which the company operated DIVERS less one, and the ratio of the company's foreign assets/total assets at year end FORGN, and finally, the auditing problems associated with inventories and receivables as measured by the two ratios receivables/total assets RECV, and inventory/total assets INV. Three variables were used to control for differences in loss

sharing ratio : first PROFIT or the ratio which measures the companies' accounting rate of return i.e., net income/total assets, second LOSS which is a dummy variable (1 if loss occurred during the past two fiscal years & 0 otherwise), third SUBJECT TO which is another dummy variable (1 if a company received a qualified audit opinion in the current year & 0 otherwise). The variable TIME was used to represent the auditor production function i.e., the number of years a company has used its current auditor.

The dependent variable audit fee was deflated by 'some' power square root transformation of assets $FEE/ASSETS^{\frac{1}{2}}$ in order to linearize the relationship between audit fees and assets and also to control for size effects. To analyze the data first multiple regression analysis was applied using the whole sample of 397 observations and the R^2 value of the derived model was 57%.

Another regression was carried out after excluding 24 banks (as they were outliers and none of them was audited by non Big Eight), and also after making some modifications in both the dependent and independent variables. The dependent variable audit fees was deflated using a power transformation of the coefficient of the variable assets ($FEE/ASSETS^{\frac{1}{2}}$). Such coefficient of assets was used because assets were found as a very significant determinant of audit fees, and also to control for size effects.

Regarding the independent variables, a power transformation using a .5 coefficient of the variable SUBS, and the log transformation of the variable TIME were also used to linearize the fitted equation. Finally, three dummy variables 0,1 were included, the first was used to split the Big Eight firms into two groups i.e., Price Waterhouse PW, and the

remaining seven AUDITOR-7, because Price Waterhouse has a high value outlier of the average audit fees. The second UTILITY which was used for the test of competition, because the dependent variable was low for the utility companies, and the third BANK was used to represent the 24 banks. The R^2 value of the derived model was 42%, and it was found that the variables control for differences in loss exposure were statistically significant determinants of audit fees. The variable AUDITOR-7 was significant with minus sign, whereas, PW was not significant.

To test the effect of the accounting firm size on audit fees Simunic divided the sample by sales size (big auditees with sales larger than \$125 m, and small auditees with sales less than \$125 m). The R^2 values were 28%, and 51% in each sample respectively, and the control variables for differences in loss exposure were again significant in both samples, whereas, neither PW nor the remaining 7 firms were statistically significant. Thus, the null hypothesis that price competition prevails throughout the market for audits of public companies could not be rejected, and therefore, Simunic believed that concentration statistics by themselves could not support the allegation that the Big Eight were monopolizing the market for audit services.

Additionally, the total system costs was also examined and the dependent variable was represented by $(FEE + ICOST / ASSETS^{-0.5})$. Similar result were obtained regarding the control variables for differences in loss exposure as they were all statistically significant. Finally, because the variable AUDITOR-7 still had the negative coefficient, Simunic suggested that the big firms enjoy scale economies which were passed on as lower prices to the auditees.

Taylor and Baker 1981²⁴ examined data of 126 British companies in the

manufacturing sector. They analysed two major factors size and complexity of the company. The size factor was represented by total assets, sales, current assets, cash, debtors, stocks, current liabilities, creditors, profit before tax, capital & reserves, and long term loans. The complexity factor was represented by number of the company's principal subsidiaries, and number of countries in which the company operates. The results of the correlation analysis revealed that current assets was the most closely associated variable with audit fees. It was also found that the square root transformation improved the association between the independent variables and audit fees. They applied factor analysis (as a data reduction technique) using all the size and complexity factors to identify the individual factors of the independent variables. Factor analysis was able to differentiate between size and complexity factors, and it indicated that total assets and number of subsidiaries respectively explained the majority of variance in these two factors. Therefore, in the multiple regression analysis they used these two individuals to develop the audit fee model; which explained 79% of the variation in audit fees. The predictive ability of the model was tested using firstly, the total sample model to predict the audit fees for each of the individual companies and secondly, they divided the total sample into 2 equal subsamples of 63 companies, and the model parameters derived from each sample were used to predict audit fees of the individual companies in the other. The general model was able to assess the audit fees charged to individual companies i.e., if the actual audit fee is more than twice as great as the predicted by the model, it is an indication that the company is in the top 5-10% in terms of audit cost, on the other hand, a company whose actual fee is less than one half of the predicted fee would have some indication that its fee was among the lowest 5-10% and may possibly be a bargain. Chiplotin and Wright 1984¹⁵ criticized the prediction of Taylor

and Baker' model as producing a very wide range of predicted results because the actual fees were at least twice the level predicted by the model in 8% of the cases and less than one-half of that predicted in a further 8%.

Taffler and Ramalingam 1982⁹⁴ designed an audit fee model based on a sample of 192 British manufacturing companies. Their model was developed using three measures i.e., size of turnover (in its double logarithmic form), auditor (using dummy variables i.e., 1 denotes smaller auditor and 0 otherwise), and industry which represents complexity (using dummy variables i.e., 1 denotes complex organization and 0 otherwise). The dependent variable audit fees was used in its double logarithmic form. Such log transformation was applied to account for the declining marginal audit cost with increasing sales, and also to overcome the heteroscedasticity problem (i.e., the variance of the error term is not constant). The derived audit fee model was able to explain 87% of the variation in audit fees, and the coefficients were statistically significant, however, the variable auditor exhibited a negative sign which was justified as the model fits the data better in the case of large firms. Their study also revealed that smaller companies were associated with lower audit fees, and joint audits with higher ones. In addition, their investigation of a subsample of 95 companies indicated that there was a steady increase in audit fees over the five years from 1973 - 1977 as the median audit fees/sales ratio went from 100% in 1973 to 129% in 1977.

Wayman and Bavishi 1983⁹⁵ tried to determine if there are international factors and differences in audit fees, by examining data of 640 companies in four countries i.e., Australia (57 companies), India (26 companies), Malaysia (30 companies), and the United Kingdom (527

companies). In their regression analysis they used audit fees as the dependent variable, and the following independent variables: industry, size of audit firm (big 13 - non big 13), multinationality of the company (multinationals are companies operate in more than 3 countries), size of company (for all companies except financial they added sales and assets, and divided this by two to average, while for financial companies, assets alone was the best measure of size), and closing month. The model derived from the U.K. data was able to explain 69% of the variation in audit fees, whereas for Australia, India, and Malaysia were 51%, 88%, and 49% respectively. It was found that size of the company was an international determinant of audit fees in all four countries. In the U.K. the multinationality and size of audit firm were also significant determinants. Finally, it was also found that in each of those countries there is an inverse relationship between audit fees and the size of the company.

Another regression model was developed by Francis 1984²⁷ to test the hypothesis that audit firm size has no effect on audit prices, and that there is no significant price cutting of initial audit fees. His analysis was based on a sample of 136 Australian companies (64 companies with Big Eight firms, and 72 with non Big Eight). Francis intended to replicate the Simunic study⁷⁷ with some modifications using Australian data.

The dependent variable audit fees was used in its logarithmic form (\log_{10} audit fees), in order to control for size effects. Francis used ten independent variables. Like the dependent variable, assets was used in its logarithmic form (\log_{10} assets) for the same reason. Subsidiaries²⁸ were used as a measure of organizational complexity, percentage of current assets to total assets to represent the auditing problems associated with current assets, and the ratios i.e., the quick

ratio and equity to debt ratio; such independent variables represented the auditor loss exposure or audit risk. The variables represented the loss sharing ratio were : profitability of the company i.e., rate of return (net income/total assets), and the dummy variables i.e., the loss in the past three years (1 if a loss occurred & 0 otherwise), and audit opinion (1 if qualified audit report is issued & 0 otherwise). Month of year-end was a dummy variable which was related to the auditor production function (1 represent June 30 year-end & 0 otherwise). Finally, accounting firm was also a dummy variable (1 if the auditor is a Big Eight & 0 otherwise).

The derived model was statistically significant with R^2 value of 74%. It was found that the accounting firm size was significant with positive regression coefficient, which meant that large audit firms were associated with higher audit prices.

When the sample was partitioned into small and large halves based on the medium value of the auditee assets the regression results also revealed that the accounting audit firm variable was significant for both the small and large samples. Therefore, the first hypothesis that audit firm size had no significant effect on audit prices was rejected.

In his second part of the study, Francis evaluated the price cutting of the initial audit fees. The suggestion was that price cutting exists if the initial audit fees are lower than the predicted fees (which was derived from the regression model in the first part of the analysis) or lower than either than prior-year or subsequent-year fees). Francis used the Wilcoxon ranked sign test to evaluate the differences between the actual and predicted fees. The results indicated that negative signs occurred significantly less than half the time. Therefore, his second hypothesis could not be rejected i.e., there was no evidence of

price cutting.

Another attempt was made by Wallace 1984⁷³ in the United States, to develop a predictive model using the following four factors : total revenue, the percent of total assets that is foreign assets divided by domestic assets, the industry in which the company operates, and the number of separate operating locations in its square root form as it exhibited a curvilinear relationship with audit fees. Like in Elliot & Korpi's study, Wallace found that total revenue is generally recognized as the key measure of size for manufacturing companies, and total assets for financial companies. Her study developed an audit fee model which explained 63% of the variation in the external audit fees. The model proposed a crude benchmark for assessing the "reasonableness" of audit fees paid by companies to their auditors as with such a model a company with operating revenue over \$500 million was expected to find the proposed benchmarks to be used.

The following table 2.3 summarizes all the factors used in the models derived from the above studies. The table also shows the statistical techniques used in the analysis, and the statistical significance of the models as measured by the R^2 value.

Study by Year Country	No. of Cos.	The dependent variable	The independent variables
Elliot & Korpi (1978) U.S.A.	60 Manuf. 42 Finan.	Audit fee multiplied by a constant or a random number to protect the confidentiality.	% Actual fee / standard fee No. of reports - 1 √ Sales * complexity [for Manufacturing Cos.] √ Assets * complexity [for Financial Cos. 1 - reduction in audit scope
[Regression analysis] R ² 94% Manufacturing Cos., 84% Financial Cos.			
Simunic (1980) U.S.A.	397	1.Fee / T.assets = e= some power square root transformation 2.Fee / T.assets = .5= regression coef. of assets 3.Fee + Icost / T. assets	Subs. Foreign assets/T.assets Receivables / T.assets Stocks / T.assets No. of SIC - 1 Net income / T. assets Loss (0,1), Subject to (0,1) Log time Audit firm PW , AUDITOR
[Regression analysis] R ² = 57% , 42%			
Taylor & Baker (1981) U.K.	126	Audit fee	<div> <div> No.of subsidiaries No.of countries √ Profit before tax √ C.assets √ C.liabilities √ Total assets √ Cash √ Sales √ Stocks √ Loans √ Debtors √ Creditors √ capital </div> <div>Factor Analysis</div> </div> <u>Regression analysis:</u> Total assets No.of subsidiaries
[Regression analysis] R ² = 79%			

Taffler & Ramalinggam (1982) U.K.	192	Log ₁₀ Audit fee	Log ₁₀ Sales Auditor (0,1) Industry (0,1)
[Regression analysis] R ² = 87%			
Wayman & Bavishi (1983) U.K. Australia India Malaysia	527 57 26 30	Audit fee	Sales + Assets/2 (Manuf.Cos.) Assets (Financ. Cos.) Audit firm (big 13-non big 13) Multinationality (more than 3 countries) Industry Closing month (0,1)
[Regression analysis] R ² = 69% (U.K.)			
Francis (1984) Australia	136	Log ₁₀ audit fee	Log ₁₀ Assets Subsidiaries ^a % Current assets / Total assets Quick ratio Equity to debt ratio Net income / Total assets Loss (1,0) Audit opinion (1,0) Month of year end Audit firm (1,0)
[Regression analysis] R ² = 74%			
Wallace (1984) U.S.A	71	Average audit fee	Total revenue Foreign assets/Total assets √ No. of separate locations Industry
[Regression analysis] R ² = 63%			

Table 2.3

Factors used in audit fees models
(Literature review)

Notes on table 2.3:

1. Multiple regression analysis is the predominant technique applied to develop the audit fee models, and to identify the significant factors affecting audit fees. In addition to regression analysis, factor analysis (as a data reduction technique was used in Taylor and Baker's

study 1981⁸⁶.

2. Different transformations were applied to either the dependent or the independent variables. For example, the square root transformation was used by Elliot and Korpi 1978²⁵, Simunic 1980⁷⁷, Taylor and Baker 1981⁸⁶, and Wallace 1984⁹³. The Logarithmic transformation was used by Simunic 1980⁷⁷, Taffler 1982⁸⁵, and Francis 1984²⁹. In addition, the use of deflators was adopted in Simunic study. Such transformations were used in order to avoid the violation of some of the regression assumptions e.g., to achieve linearity between the dependent and the independent variables, or to overcome the problems of multicollinearity (the interaction between the independent variables), and heteroscedasticity (the error term is not constant).

3. The dependent variable audit fees was used in different measures. Some studies used the absolute values of audit fees (Taylor and Baker 1981⁸⁶ and Wayman & Bavishi 1983⁷⁶), whereas others used log fees (Taffler & Ramalinggam 1982⁸⁵, and Francis 1984²⁹), average audit fees (Wallace 1984⁹³), and fees deflated by assets (Simunic 1980⁷⁷). Such modifications of the audit fees were used for the same reasons mentioned above.

4. The above studies linked audit fees to various factors which could be classified broadly into three groups i.e., size of the company, its complexity, and others. Generally, total assets and sales were the factors most often used in these studies.

5. The table also indicates that a number of attempts were made to quantify some of the subjective factors e.g., the quality of the company's internal control system, which was represented by 1-%

reduction in the scope of audit because of the reliance on the company's internal control system (Elliot and Korpi 1978²³), and also the use of the dummy variables 0,1 (Simunic 1980⁷⁷, Taffler & Ramalinggam 1982⁸⁵, Wayman & Bavishi 1983⁷⁶, and Francis 1984⁸⁹). Finally, all the models designed in the above studies were statistically significant, with R² value ranged between 42% - 94%.

The present study adopted similar approach to Taylor and Baker's study 1981⁸⁴ regarding the application of the principal component technique, and the use of some of the individual components of the balance sheet, and the profit and loss account items. Despite this similarity there are some differences i.e., unlike Taylor and Baker's study, this study does not use both the total and components of the same factor at the same time. For example, they used total assets, as well as current assets, cash, debtors, and stocks. They also used current liabilities, as well as creditors. The use of these factors is not correct as some of them are accounted twice.

On the other hand, this study is different, as the selection of the factors to be used in the analysis was based on the results of an empirical study through a questionnaire survey. The factors identified as the most important were then considered for further inclusion in the statistical analysis. Thus, some factors were excluded from the analysis such as, cash, and current assets, and another new factor was introduced i.e., total employment costs, which in this study was found to be a very significant factor.

There is another difference i.e., this study used the two factor scores (which represent all the size and complexity factors) derived from the application of the principal component technique as independent

variables in the multiple regression analysis, whereas only total assets (which explains most of the variance in factor one) and number of subsidiaries (which explains most of the variance in factor two) were used in Taylor and Baker's study. Of course, the use of a single variable from each factor will simplify the final model and reduce the computational effort, however these variables are not necessarily the most significant determinants of the dependent variable audit fees.

CHAPTER THREE

CHAPTER THREE

THE FACTORS AFFECTING THE LEVEL OF AUDIT FEES

Introduction:

The level of audit fees is influenced by a number of quantitative and qualitative factors, which affect it directly and indirectly, and can be related to auditors, auditees, or general factors. Therefore, this chapter classifies these factors according to three main criteria as follows:

3.1: Factors classified according to their impact on the level of audit fees.

3.2: Factors classified according to their nature.

3.3: Factors classified according to their relation to the auditor and the auditee.

The final section of this chapter 3.4 lists all the factors identified through the literature survey.

3.1: Factors classified according to their impact on audit fees:

The factors thought to affect the audit fee can be categorized into firstly, those factors which have direct impact on the cost of time and consequently the audit fee, and secondly, general factors i.e., factors which have a general or indirect impact on the level of audit fee, as shown in figure 3.1.

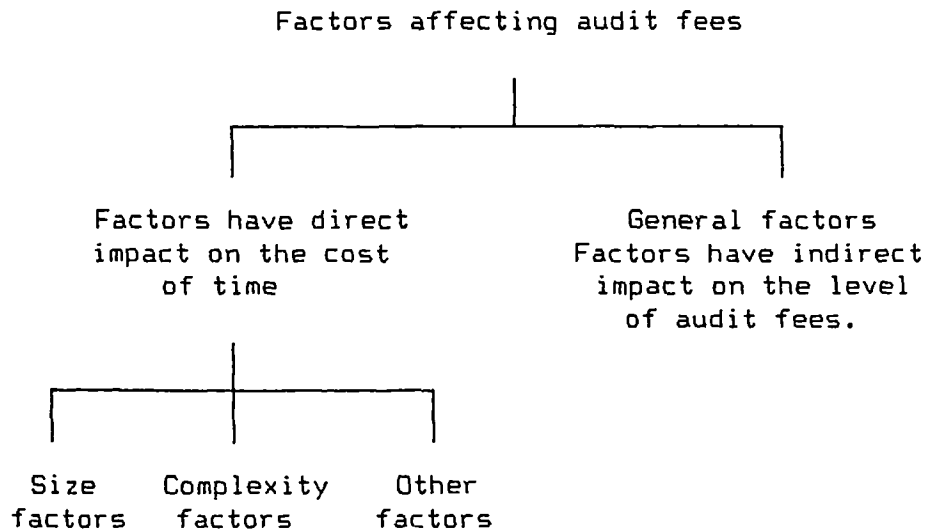


Figure 3.1

Factors classified according to their impact
on audit fees

1. Factors have a direct impact on the cost of time:

Figure 3.1 shows that the cost of time can be viewed as a function of size, complexity, and other factors. Such factors affect directly the time devoted by the auditor and his staff in conducting the audit work.

The size factors:

Generally company size can be measured by the balance sheet items, which give certain dimensions of size, such as, total assets, stocks, debtors, creditors, etc. These measures of size might indicate the items where the auditing work load is heaviest, and major efforts could be expended.

Size can also be measured by the profit and loss account items, such as turnover, profit, and total employment costs. The size of total assets and turnover were the factors most often used in previous studies to represent company size such as, Elliot and Korpi 1978²⁵, Simunic 1980⁷⁷,

Taylor and Baker 1981⁸⁴, and Wallace 1984⁷³.

Generally, it can be hypothesised that the larger the company size in terms of these items, the longer the audit process, and consequently the higher the audit cost. However, the size factors are expected to exhibit economies of scale i.e., as the company gets bigger as measured by these factors the audit fee gets proportionally lower.

The complexity factors:

The complexity of the company is another factor affecting the cost of time, as auditing requirements will be influenced by the degree of the complexity of the engagement.

Several factors can be used to reflect the complexity of the company. Elliot and Korpi 1978⁸⁵ included three measures of complexity in their study i.e., firstly, physical complexity as measured by number and location of operating units, and the diversification of product lines. Secondly, legal complexity as measured by number of the company's subsidiaries and affiliates, and number of countries in which the company operates i.e., the multinationality of the company. Thirdly, reporting complexity as measured by number of separate audit reports issued annually for the company such as combining financial statements and separate reports on subsidiaries and affiliates. Generally, it can be hypothesised that the greater the complexity of the company the higher the audit fees.

The other factors:

The quality of the company's internal control system, and the participation of the internal auditors also influence the scope and size of the audit work. In other words, the auditing procedures can be

reduced if the company has a high level internal control.

A number of studies have examined the relationship between audit fees and the role of internal auditors. For example, Hobgood and Sciarrino 1977³⁶ noted that some companies are able to hold their fees down by using effective internal audit staff. In their model, Elliot and Korpi 1978²⁹ used the percentage reduction in the external audit scope as a result of the reliance on internal auditors. In addition Briston & Perks 1979¹¹ indicated that considerable savings in audit efforts and audit costs should result if there is a combination of internal and external audit function within a truly independent audit department. Mapi 1980⁶⁰ also found that "the increased internal audit efforts and the improved quality of the financial management were apparent reasons for the external audit fee decreasing from 1976 to 1980 for companies belonging to the Machinery and Allied products institute". Finally, according to Ward & Robertson's study 1980⁷⁵, it was found that several auditing organizations have guides and programs for reliance on internal auditors, with such programs audit will be more efficient.

The degree of the risk involved in the audit work could be a consideration when determining the audit fee, as it could affect the auditors' responsibility. This responsibility is closely related to the risk involved, i.e., the more risk involved in the audit work the greater the responsibility which deserves a higher fee to compensate the auditor for taking such risk. Generally, the degree of risk involved in the audit work, varies depending on the nature of the company's business i.e., financial (such as banks, insurance companies etc.), industrial, and merchandizing. The extent of responsibility could also vary depending on "the intended use of the reports rendered, the amount involved, liability of the accountants to third parties, and obligations

or responsibilities imposed by governmental regulations", Morgan 1974²⁵.

The date of the company's year-end could also have an impact on the level of audit fee i.e., auditors might charge higher fees if the company's year-end during the audit firm's busy season.

2. General factors :

The level of audit fees can be influenced by other general factors, which are indirectly related to the engagement e.g., the size of audit firm. Some big firms in the U.K. charge more than others for auditing companies of similar size and in the same industry²⁶. Conversely, Simunic 1980²⁷ found that the big firms enjoy economies of scale which could be passed on as lower prices to their clients.

Other factors could also have a general impact on the level of audit fees, i.e., the nature of the market for audit services, the probability of obtaining non audit work such as, accounting, taxation, and management consultancy services, the continuity of client, and the reputation of company.

3.2: Factors classified according to their nature:

The factors which enter into determining the audit fee can also be classified into objective and subjective.

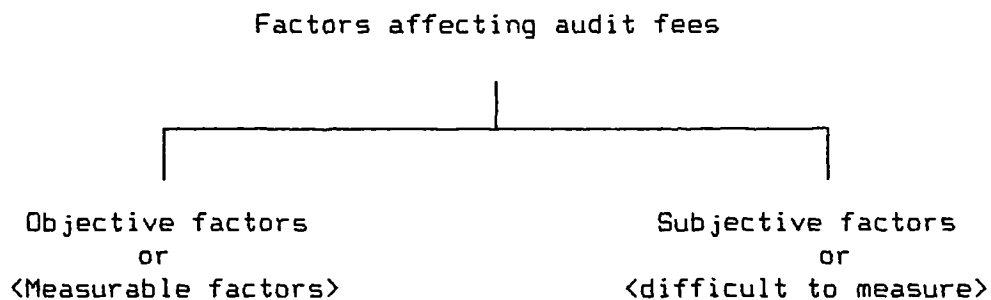


Figure 3.2

Factors classified according to their nature

1.The objective factors: are factors which can be accurately quantified. For example, the time spent in the audit work can be precisely measured by the number of hours worked by the auditor and his staff. The size of the company is also a measurable factor by some of the balance sheet or the profit and loss account items. Finally, some measures of complexity can also be quantified, for example by number of subsidiaries, number of countries, and number of reports.

2.The subjective factors: Some subjective factors are difficult or almost impossible to quantify e.g., value of the service to the client. It varies according to the purpose of the service itself, which ranges from basic accounting services such as book keeping, to more general management consultancy services. "The most obvious situation arises where savings can be affected: savings in taxes, savings attending the

installation of a new accounting system, savings in costs of construction, savings in litigation, and savings in operating costs. Morgan 1974⁴³. Such situation could be considered an important factor by the auditor when determining his fee. "The value of the services is closely related to ability of the company to pay, and in many instances the two are almost indistinguishable". Morgan 1974⁴³, and Flesher & Soroosh 1980²⁸.

In addition to the value of the services to the client, the degree of the risk and responsibility involved in the audit work, the quality of the company's internal control system, nature of the market for audit services, and the reputation of the company are also subjective elements in fee determination.

3.3: Factors classified according to their relation to auditor and auditee:

The factors affecting the audit fee can also be classified into factors relating to the auditor, auditee, and general factors.

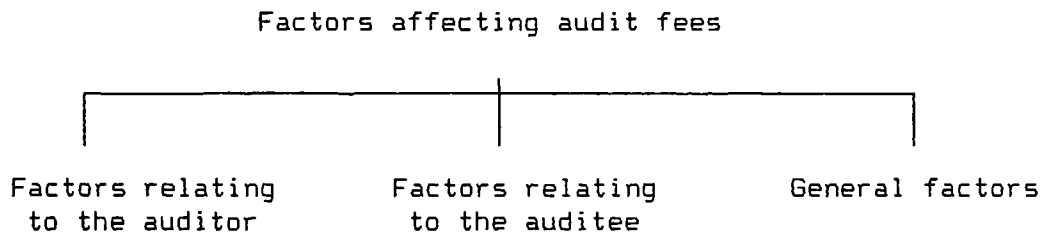


Figure 3.3

Factors classified according to their relation
to auditor, auditee, and general factors

1.Factors relating to the auditor: such as the number of staff involved in the audit work, seniority of the persons engaged based on their knowledge, experience, and skills. In addition, the facilities in the audit firm, and its reputation may also be considered by the auditor when determining his fee.

2.Factors relating to the auditee (company): For example company size, the nature of its business, the quality of its internal control system, value of the service to the company, the company's ability to pay, the date of the company's year end (whether it is during the audit firm's busy season or slack season), the company's reputation, and multinationality of the company may all play a part in determining the audit fee.

3.General factors: "Character of the community may also have an impact

on the level of audit fees, as generally living expenses are often lower in small cities, therefore a smaller fee might be appropriate" Morgan, 1974⁴⁵. Nature of the market for audit services, the company's previous fee, inflation, and governmental regulation may all be elements in this context.

3.4: List of the factors identified through the literature:

The following is a list of the major factors identified through the literature review, divided into three major groups i.e., size factors, complexity factors, and other factors (which includes both the other and the general factors together).

The size factors:

- Turnover
- Profit before tax
- Trading profit
- Stocks and work in progress
- Debtors
- Cash
- Total assets
- Current liabilities
- Creditors
- Current assets
- Loan capital
- Share capital and reserves

The complexity factors:

- Number of the company's subsidiaries
- Number of countries in which the company operates

- Number of product lines
- Location of plants
- Nature of company's business (Manufacturing, Financial, etc.)
- Type of industry (electricals, chemicals, food manufacturing, etc.)
- Degree of centralization of financial control
- Degree of computerization of accounting records
- Number of audit reports

The other factors:

- Quality of the company's internal control system
- The risk involved in the audit work
- Degree of responsibility
- Date of the company's year-end
- Size of the audit firm
- Skills and experience of the audit staff
- Competition in the audit market
- Value of the service rendered
- Inflation
- Probability of obtaining non-audit work
- Importance of the service to the client
- Continuity of the audit firm
- Size and characteristics of the community
- Previous fees
- Special consideration to a new client
- Reputation of the company
- Reputation of the audit firm
- Company's ability to pay
- Extra compensation for inconvenience
- Legal limitations
- Contingent or fixed fees

— Urgency of work to be completed

— Location of the auditing firm

Conclusion:

This section identified most of the likely factors thought to affect the level of audit fees paid by companies to their auditors. The relative importance of these factors will probably vary from one case to another according to the nature and the circumstances of the engagement, and the weight given to each factor can only be determined by the auditors and auditees, and is largely subjective. Such subjective judgement was sought to be identified empirically through the questionnaire survey.

CHAPTER FOUR

CHAPTER FOUR

RESEARCH METHODOLOGY

Introduction:

To identify and analyze the data of the present study two main methods were adopted. Firstly, an empirical study (through questionnaire survey and personal interviews) was made of auditors and auditees to obtain their opinions as to the key factors, and their relative significance. Secondly, a statistical analysis was performed on these factors to determine and analyze their association with audit fees.

The results of both methods are discussed in chapters five and six regarding data analysis, whereas this chapter is devoted to the background of the study data and the framework of its analysis. It is divided into the following sections:

- 4.1: Data collection.
- 4.2: Sample selection.
- 4.3: Data definition.
- 4.4: Data classification.
- 4.5: The study analytical framework.

4.1 DATA COLLECTION:

This section provides a summary of the process of data collection, which includes the main data sources. Three major sources of data collection were used in this study namely:

1. Published financial information.
2. Personal interviews.
3. Mail questionnaire survey.

1. Published financial information:

Mainly the financial information was obtained from the companies' annual report and accounts of 1983. In collecting the annual reports the following procedures were used: firstly, Data Stream¹⁷ was used to identify the names of the top listed British companies ranked by turnover. Secondly, Extel Cards and Compass U.k.1986²⁴ were used to obtain the addresses of these companies. Finally, by sending letters to the companies, their annual reports were obtained. The annual reports provided most of the data needed for the statistical analysis such as the size factors in terms of the company's turnover, stocks and work in progress, debtors, creditors, and total employment costs. In addition, Who Owns Whom 1983²⁷ was also used to obtain the number of the company's principal subsidiaries, and the number of countries in which the company operates.

2. Personal structured interviews:

A series of supplementary personal structured interviews with three auditors and a finance director were carried out in Edinburgh. The interviews were conducted before mailing the final questionnaire. The main objectives of these interviews were to discuss the preliminary questionnaire for clarification purposes, to confirm (or reject) the factors identified in the literature, and finally, to identify a reduced number of factors for inclusion in the final questionnaire. The obvious advantages of such interviews were to allow greater flexibility to

obtain detailed and clear answers, and to test if the questions will be readily understood by the respondents.

3. Mail questionnaire survey:

In order to assess the degree to which the factors previously identified by the literature review are determinants of audit fees, and whether there are other factors affecting its level two mail questionnaires were designed, one was sent to a sample of companies (finance directors), and the other to a sample of audit firms (auditors). These two groups were chosen as they were most closely involved with the process of the determination of audit fees, and should have knowledge of the factors which affect its complexity and the time needed to complete an audit. A copy of the full text of both questionnaires used in this study are included as appendices (1 & 2).

The questionnaires of this study were not used to collect financial information like in other studies' questionnaires, e.g., Elliot and Korpi 1978²⁵, and Simunic 1980²⁷, because all the financial information had already been collected from published sources before sending out the questionnaires. Therefore the questions concentrated mainly on obtaining the respondents' opinions in assessing the importance and impact of this information in respect of the study's objectives.

Although initially it was hoped to do so, the questionnaires were not used to try to measure or to quantify any subjective elements in the determination of audit fees, such as the quality of the company's internal control system, the degree of the audit risk involved, and the degree of computerization of the company's accounting records. A number of trials for this were made during the testing of the draft

questionnaire especially regarding the company's internal control system. Unfortunately, such trials led to a strong rejection by both auditors and auditees, for reasons such as difficulties in quantifying and measuring these subjective factors. In addition, the measuring process was considered as a relative matter which may lead to misleading or even meaningless results. An example of these trials is reported in the interviews analysis (page 78).

Choice of the questionnaire survey:

The questionnaire survey is one of the appropriate data collection methods in the social sciences and has the following advantages: (Nachmias 1981⁶⁷, Kanuk & Bernson 1975⁶⁴, Dillman & Frey 1974⁶⁴).

----- The questionnaire survey is relatively low in cost, especially when the survey requires coverage of a population which is widely spread geographically; in such a situation interviewing would become a very expensive method.

----- The questionnaire survey is a good method in reducing errors as a result of the absence of the interviewer and the impact of his personal characteristics.

----- When the survey deals with sensitive issues, mail questionnaire tend to be more helpful in eliciting high response rate than a personal interview because of the anonymity factor, which also minimize the invalid responses.

----- In addition, mail questionnaires are preferable because they enable respondents to think freely or consult other people rather than giving immediate answers as in the case of a personal interview.

----- Finally, busy respondents can be reached and surveyed relatively easily.

The major deficiencies of the questionnaire survey are: their response rate is much lower than the personal interviews, no opportunity for probing to clarify ambiguous answers, no control over who fills out the questionnaire, non response bias, and finally questionnaires always require simple questions. (Kerlinger 1973⁵⁵, Kanuk & Bernson 1975⁵⁴, and Nachmias 1981⁶⁷).

The following procedures were adopted to overcome the shortcomings of the questionnaire survey: (Berdie 1973⁷, Dillman & Frey 1974²⁴, Kanuk & Bernson 1975⁵⁴, Sinclair 1975)⁷⁸.

Mailing the final questionnaire:

In mailing the final questionnaire the following procedures were used:

----- Preliminary questionnaires were discussed with a number of appropriate individuals to obtain their comments. Sinclair 1975⁷⁸ strongly recommended the pretesting of a draft questionnaire. It is worth noting that these discussions were helpful to avoid ambiguity from question wording which also satisfied the researcher that all respondents should understand the question in the same way.

----- The covering letter was written on Heriot-Watt University departmental headed note paper and signed by the researcher. Nachmias 1981⁶⁷ noted that the type of sponsorship has a significant effect on motivating a respondent to complete the questionnaire. He indicated that government sponsored questionnaires receive the highest response rate followed by prestigious organizations such as universities, and finally little known commercial organizations. The covering letter included a brief non-technical summary of the purpose of the survey. In addition, respondents were guaranteed complete confidentiality in respect of the survey responses and also promised feedback of the results. A copy of

the covering letter is inclosed as appendix (1).

----- A stamped self addressed envelope was provided with the questionnaire for the returns.

The questionnaire design and construction:

Regarding the questionnaire design and construction, the following recommendation were taken into consideration:

----- Clarity of questionnaire structure was considered, hence the questionnaires were designed basically in three main sections: the first section dealt with the size factors, followed by the complexity factors in section two, and the third section included the other factors.

----- The questionnaires were not so lengthy as to disturb respondents. The companies' questionnaire consisted of six pages, whereas the auditors' questionnaire five pages. The questions in both questionnaires were identical, but the companies' questionnaire included four additional questions. Two sides of one sheet were used rather than two sheets, again as recommended by Stopher & Meyburg 1980²¹.

----- The requirements of simplicity, directness, and sequence of questions were also considered to avoid ambiguity from question wording and to elicit accurate responses. Mainly, two types of questions were used depending on the aim of the question. Firstly, closed ended questions were used, especially when the question required a straight forward answer like yes or no (e.g., did you change your audit firm during the past three years?), or when the respondents were asked to select from a given alternative such as indicating the impact of some factors on the level of audit fee (e.g., higher fee, lower fee, no effect). These types of questions are easy to ask and quick to answer as they require no details Nachmias 1981²⁷. Secondly, to obtain additional and detailed information and comments, open ended questions

were used, as they allow greater flexibility and more depth in the respondents answers. For example, respondents were asked after each section to specify any other factors if any, which are believed to have a significant impact on the level of audit fees. The ranking technique was also used to identify the four most important size, complexity, and other factors regarding their relative order.

----- Finally, adequate space after each section was provided to give respondents opportunity to comment and express their opinions. Generally, no deadline date for questionnaire returns was set to allow respondents to complete their answers in the convenience of their own time. Analysis of the respondents opinions is presented in chapter five.

4.2: SAMPLE SELECTION (STATISTICAL ANALYSIS, AND SURVEY):

This study includes two samples, the statistical analysis sample, and the questionnaire survey sample.

The statistical analysis sample:

The statistical analysis of this study was performed on a biased sample of the largest 65 manufacturing listed British companies ranked by turnover as identified by Data Stream. The sample covered a variety of manufacturing companies e.g., electricals, oil, electronics, food manufacturing, brewers, motors, chemicals, tobacco, textiles, building materials, and mechanical engineering.

The survey sample:

The survey sample consisted of the following two samples of companies and audit firms:

The companies' sample:

A sample of 100 large industrial companies was selected from the top listed British companies. The sample included the same 65 companies used in the statistical analysis, plus 35 others also identified by Data Stream¹⁹ and representing large companies in the manufacturing sector.

The audit firms'sample:

A sample of 100 practising auditors were selected. From the 1985-1986 ICAEW, Lists of Members and Firms⁴⁴ 90 auditors were selected, whereas 10 auditors were chosen from the 1985 ICAS Official Directory⁴⁵. The total sample of 100 auditors were taken from the largest 50 audit firms in London (including the big 10) as measured by their number of partners (firms with more than 10 partners in a firm), and the largest 50 audit firms in Scotland and the rest of England and Wales (firms with more than 5 partners in a firm). Such criterion was used as it was the obvious and available measure of identifying the largest audit firms. The biggest audit firms were chosen as the present study is based on a sample of the largest companies, which are mainly audited by the biggest audit firms as will be seen in section 4.4. The sample also covered all auditors who audit the companies'sample. Summary of the audit firms'sample is shown in figure 4.1.

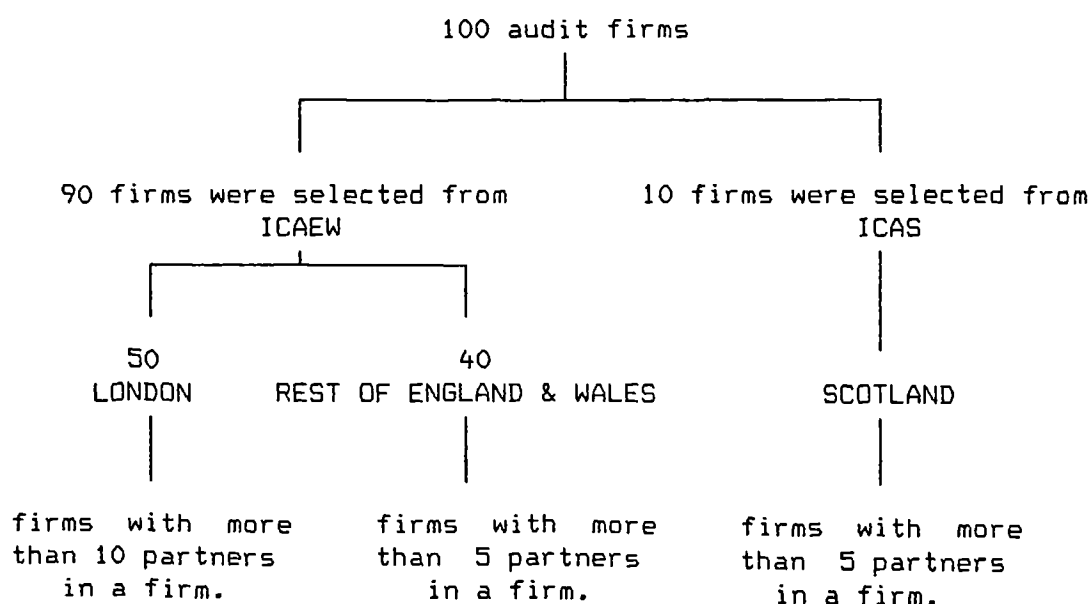


figure 4.1

The audit firms'sample

4.3: DATA DEFINITION:

This study was carried out on the published accounting data which obtained mainly from Data Stream, and the companies annual report and accounts 1983, and Who Owns Whom 1983⁷⁷. The data obtained from the companies annual report and accounts consisted of a group of variables representing some profit and loss account items (i.e., audit fees, sales, and total employment costs), and some balance sheet items (i.e., debtors, creditors, and stocks & work in progress); These items also represented the analysis of size factors. The two quantitative measures of complexity of the company i.e., number of the company's principal subsidiaries and number of countries in which the company operates were mainly obtained from Who Owns Whom⁷⁷, and represented the analysis of complexity factors.

The following definitions summarize the components of each variable or how its value was calculated (such definitions were mainly obtained from Data Stream manual¹⁷ and Who Owns Whom⁷⁷):

Audit fees:

Audit fees means the total fees paid by the company to its auditor, domestic and foreign, and for all subsidiaries. It includes all the expenses relating to the audit work, but excludes any other special work not related to the audit, such as accounting, taxation, or management consultancy services. The value of audit fees should be disclosed in the company's annual report as auditors are required to disclose it for statutory purposes, as stated in the fourth schedule of the Companies Act 1985⁸¹.

Sales turnover:

Sales represent the total sales which include: U.K. sales i.e., sales to third parties in the U.K., overseas sales i.e., sales to third parties made by overseas subsidiaries, and exports i.e., sales from U.K to overseas customers.

Employment costs:

Total employment costs include the wages and salaries for both full and part time employees inside and outside U.K. It includes for example social security costs, profit sharing (amounts payable to employees from profit sharing schemes). It excludes directors emoluments inside or outside U.K., and any other costs in respect of directors or chairmen.

Debtors:

Debtors represent the amounts owed to the business by its customers. It contains trade debtors (receivables directly relating to the normal business activities, which are payable in more than one year), plus other debtors due for settlement within one year but do not relate to a company's usual activities, less any bad debt provisions and unearned charges).

Creditors:

Total creditors include trade creditors (those directly relating to the normal business activities, and normally due within one year), plus trade creditors relating to the normal business and due in more than one year, and other creditors which are normally due for settlement within one year but do not relate directly to a company's usual activities. It also includes creditors due to group companies.

Stocks and work in progress:

Stocks and work in progress consist of three main items: stocks (i.e., stocks of raw materials, finished goods, and those in various stages of manufacture), plus work in progress (which consists mainly of long-term contract work in progress), less advance for work in progress (e.g., advances paid in respect of work carried out on long-term contract).

Number of principal subsidiaries:

In this study only the number of the principal subsidiaries of the sampled companies was included, whereas the associated companies were excluded. A company was considered to be a subsidiary if the parent company owned more than 50% of its equity share capital. The principal subsidiaries also represent all companies incorporated inside and outside the U.K, which are directly or indirectly controlled by the parent company.

Number of countries:

Number of countries in which the company operates includes only the countries which the company has principal subsidiaries operating in it.

4.4 DATA CLASSIFICATION:

To give a clear idea of the data in this study, the 65 companies used in the statistical analysis were classified by size of turnover, audit fee size, audit firm size, and kind of industry as shown in the following tables :

1. Classification of the data by size of turnover:

Table 4.1 shows number of companies classified by size of turnover divided into three classes ranged between £60.0 m : £33 bn. It also shows the percentage of total. The total turnover of the 65 companies is £143.2 bn, and the average sales size for the 65 companies is £2.2 bn.

Size of turnover	No. of companies	% of total
£ 60 m : £ 999.9 m	29	44.6
£ 1 bn : £ 1.9 bn	23	35.4
£ 2 bn : £ 33 bn	13	20.0
	65	100

Table 4.1

Companies classified by size of turnover

Comparison of the audit fees charged with the size of companies' turnover indicated that generally the average of audit fees increases as the companies' size increases, as shown in the following table 4.2.

Size of turnover:	Average audit fees paid	Range of audit fees paid
£ 60 m : £ 999.9 m	£ 525 (000)	£ 60 (000) : £ 1.4 m
£ 1 bn : £ 1.9 bn	£ 1.2 m	£ 253(000) : £ 2.0 m
£ 2 bn : £ 33 bn	£ 2.6 m	£ 500(000) : £ 6.3 m

Table 4.2

Size of turnover by average of audit fees

Table 4.2 indicates that for companies with size of turnover between £60 million - £ 999.9 million the average audit fees was £ 525(000), it increases to £ 1.2 million for companies with sales size range between £1 billion - £ 1.9 billion, and for companies with turnover ranges between £ 2 billion - £ 33 billion the average audit fees also increased to £ 2.6 million. The table also displays the range of the lowest and highest audit fees paid by the individual companies of comparable size within each category. This range provides some indication of the overlap of the amount of audit fees paid among the three classes of turnover, as the data revealed that some companies were paying higher than other companies with similar size of turnover or even less e.g., a company with an annual turnover of £ 2.3 billion is paying audit fees of £500,000, whereas another company with turnover of £ 1.5 billion is paying audit fees of £2 million. In addition, two companies with turnover £76 million and £2 billion respectively are paying the same amount of audit fees £ 600,000. The reasons for such variation could be due to other differences e.g., in the problems or difficulties of each company, and the quality of their internal control systems.

On the other hand, although the average of audit fees increases as the size of turnover increases, the following table 4.3 indicates that audit fees as a percentage of the annual turnover decrease, i.e., audit fees have a negative relationship with the size of turnover. In other words, smaller companies tend to pay a larger percentage of annual turnover in audit fees.

Size of turnover:	Average audit fees as % of turnover	Range of audit fees as % of turnover
£ 60 m : £ 999.9 m	0.1 %	0.01% - 0.2%
£ 1 bn : £ 1.9 bn	0.07 %	0.02% - 0.1%
£ 2 bn : £ 33 bn	0.04 %	0.02% - 0.09%

Table 4.3

Size of turnover by average of audit fees as percentage of turnover

Table 4.3 reveals that the average of audit fees as percentage of turnover was 0.1 % for companies with turnover ranges between £60 million - £ 999.9 million, it decreases to 0.07 % for companies with turnover between £ 1 billion - £ 1.9 billion, and for companies with turnover between £ 2 billion - £ 33 billion the average percentage of audit fees to turnover was also decreased to 0.04 %. This finding is compatible with earlier studies such as Hobgood & Sciarrino 1972³⁶, Briston & Perks 1977¹¹, Taylor & Baker 1981³⁶. and Wallace 1984⁷³. For example, Briston & Perks found that audit fees as a percentage of turnover was 0.1 % for companies with total turnover £2.2 bn, decreasing to 0.04 % for companies with total turnover £69 bn.

2. Classification of the data by audit fee size:

Table 4.4 shows number of companies classified by audit fee size which range between £60,000 - £6.3 m. The average fee size is £ 1.2 m. It also shows the percentage of total. Generally, the 65 companies with combined turnover of £143.2 bn, paid approximately £77.9 m in audit fees, the average audit fees is £1.2 m, and the audit fees as a percentage of turnover for the whole sample is .05%.

Audit fee size:	No. of copmanies	% Of total
£ 60,000 : £ 999,000	38	58.46
£ 1 m : £ 1.9 m	18	27.69
£ 2 m : £ 6.3 m	9	13.85
	65	100

Table 4.4

Companies classified by audit fee size

3. Classification of the data by audit firm size:

Table 4.5 shows number of companies audited by one of the big 10 firms and non big 10, and percentage of total. *The Big ten audit firms are: Arthur Andersen, Arthur Young, Coopers & Lybrand, Deloitte Haskins & Sells, Ernst & Whinney, Thornton Baker, KMG Thomson McLintock, Peat Marwick, Mitchell & Co., Price Waterhouse, and Touche Ross.

Audit firm size:	No. of companies	% of total
Big 10 firms*	57	88 %
Non big 10	8	12 %
	65	100

Table 4.5

Companies classified by audit firm size

This study focuses on the domestic market for audit services i.e., England & Wales, and Scotland. To identify the above ten biggest audit firms in this market, there are different ways which could be used, such as the firm's number of partners, number of firm's clients listed in the stock exchange, the firm's average fees, and the profitability per partner which was considered by the auditors interviewed as a good measure of efficiency and productivity of the audit firm, but unfortunately such information is not publicly available. The criterion used in this study was the audit firm's gross fees. The Financial Times June 1981²⁷, ranked the twenty biggest U.K. accountancy firms. It identified the biggest ten firms in the descending order by gross fees income (in £m) as follows: Peat Marwick, Mitchell & Co.49, Deloitte Haskins & Sells 48.1, Ernst & Whinney 47.1, Coopers & Lybrand 45, Price Waterhouse 40, Touche Ross 39.5, Arthur Young 36, Thornton Baker 30, Arthur Andersen 24.5, and Thomson McLintock 24.1.

4. Classification of the data by kind of industry:

This study is based on data of companies in the manufacturing sector. The following table 4.6 presents the number of companies in each sector, and the percentage of the total.

Kind of industry :	No. of companies	% of total
Food Manufacturing	10	15.4
Brewers & Distillers	7	10.9
Oil	6	9.2
Electronics	6	9.2
Building Materials	6	9.2
Health Household Products	4	6.2
Tobacco	4	6.2
Mechanical Engineering	4	6.2
Chemicals	4	6.2
Packing and Papers	3	4.6
Textiles	3	4.6
Other Industrial Materials	2	3.1
Electricals	1	1.5
Metal and Metal Forming	1	1.5
Office Equipment	1	1.5
Telephone Network	1	1.5
Contracting and construction	1	1.5
Motors	1	1.5
	65	100

Table 4.6

Companies classified by kind of industry

From table 4.6 it can be seen that there is only a small number of companies for most industries. Therefore, the results of any separate analysis of the data by kind of industry will have little validity.

3.5: THE STUDY ANALYTICAL FRAMEWORK:

The relative importance of the factors previously identified through the literature survey is determined empirically, and statistically. therefore, data analysis in this study is divided into two main parts, as shown in figure 4.2. Firstly the analysis of the empirical study which is presented in chapter five. It contains the results and discussion of the personal interviews, and both the companies' & audit firms' questionnaires. Secondly, the statistical analysis of the data which is presented in chapter six. It contains the results and discussion of the preliminary statistical procedures, the principal component analysis, and the multiple regression analysis.

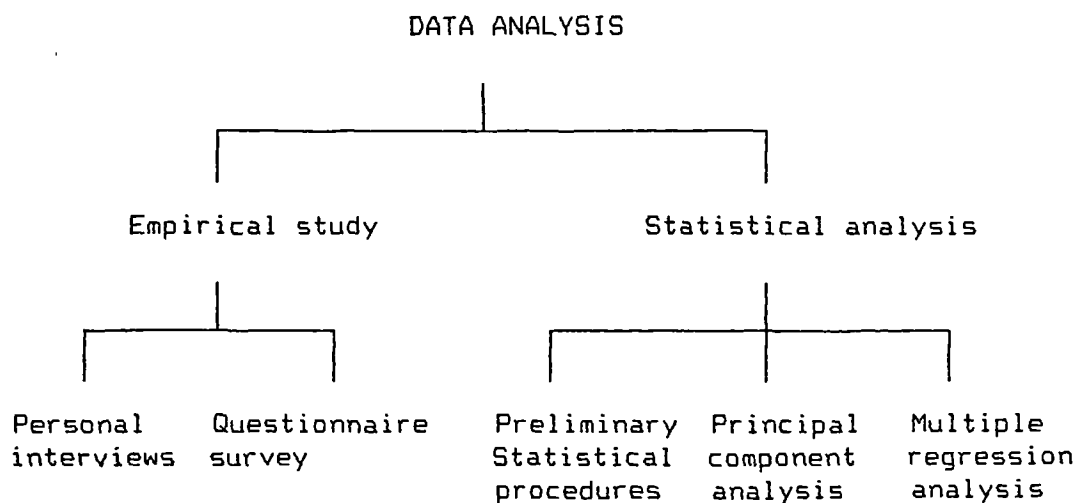


Figure 4.2

The data analysis flow diagram

CHAPTER FIVE

CHAPTER FIVE

ANALYSIS OF THE EMPIRICAL STUDY

Introduction:

In order to achieve the study objectives an empirical study was undertaken. Firstly, a number of personal interviews were carried out in order to identify the most important factors of those collected through the literature for further inclusion in the final questionnaire, and whether other factors should be considered. Secondly, a questionnaire survey was also conducted in order to assess the degree to which the factors previously identified are important determinants of the audit fees. Generally, the empirical study sought to answer a number of questions such as, how do companies and audit firms determine their audit fees?, do they depend only on time basis?, what are the other factors if they do not depend only on time?, what is the 'fairest' method in determining the audit fees?, are companies satisfied with the level of the fees they pay to their auditors?, what do they do to hold the fee down if they consider it high?, do the big auditing firms charge higher fees than smaller firms?, If yes what are the main reasons for this?, and finally, what are the most important size, complexity, and other factors which affect directly and indirectly the amount of audit work and consequently the level of audit fees.

This chapter is devoted to the analysis of the empirical study. It contains the following sections:

- 5.1: Results and discussion of the preliminary interviews.
- 5.2: Results and discussion of the companies' questionnaire.
- 5.3: Results and discussion of the audit firms' questionnaire.
- 5.4: Summary of the major findings of the empirical study.
- 5.5: The statistical analysis variables.

5.1 RESULTS AND DISCUSSION OF THE PRELIMINARY INTERVIEWS:

This section reports the findings of the responses from the interviews with the auditors of 3 major audit firms in Scotland and a finance director. Each audit firm audits a number of the largest British companies in various sectors, and the company is audited by one of the big ten audit firms.

The main and fairest method in the determination of audit fees:

All the auditors interviewed believed that audit fee is a combination of the time spent in the audit work (which represents the largest element in a fee) and a number of other factors such as the quality of the company's internal control system which was believed to be a major element influencing the scope and cost of the audit work. One auditor emphasised that audit work in practice is a combination of two types of work, substantive work where the auditors check back that the calculations have been made properly to get independent confirmation such as, debtors or creditors circulization, and compliance work where auditors check that the systems within the company are appropriate. If the company has a high level internal control system, then the audit work will be concentrated on the compliance side, which will decrease the amount of audit work. Whereas, it will go to the substantive side if the system is poor and a greater amount of work will be needed.

Because the quality of the company's internal control system seemed to be of such importance, the auditors were asked about the possibility of quantifying such factor for further inclusion in the final questionnaire and the statistical analysis. For example, by using a percentage reduction in the scope of audit work as a result of the reliance on a high level internal control system. This method of quantifying such a factor was used in Elliot and Korpi' study 1978²⁵. The answers were negative. It was felt that "it is difficult to give a percentage reduction by moving from one type of work to another, and the answers to such a question could be meaningless, and the results could also be misleading".

Competition in the audit market was another important factor mentioned by auditors, as they all believed that there is strong and severe competition in the audit market in Britain both between big and small firms and also among big firms. Such competition could reduce the fee to a very low level in order to win a competitive tender, but could not be in the interest of both the client or the auditor in the long run as there would be a temptation to reduce the standard of the service to match the price, and consequently the quality of audit would deteriorate. One auditor commented that "we are in business, and if I want the business and I know that somebody else is going to quote e.g., £17,000 I might quote £15,000".

The auditors also believed that the risk involved in the audit work was an important factor to be considered when determining their audit fees. Generally, they believed that the audit risk varies among companies depending on the nature of the companies' business e.g., the risk in financial institutions and companies in a high tech industry was far

greater than other areas such as a retail situation, as the risk of error in these areas is more likely to be a serious error because of the likely high level of publicity. There have been examples in the City recently such as, "the collapse in 1984 of Johnson Matthey bankers, which was brought down by dodgy loans (loans to foreign countries and proved not to be recoverable), what the Chancellor of the Exchequer called 'unwise and imprudent lending'. Another example includes Lloyd's of London the insurance market, where £400 m belonging to syndicates went missing", The Economist 1987⁴.

The finance director also believed that the audit fee paid to the auditor is a combination of the time spent on the audit work, and a payment for the responsibility which the auditor accepts for 'writing his name against the accounts'. He indicated that time is a good basis for the auditor to build up the audit cost. However, it is the auditors' concern, and he was not particularly concerned per se about how much time was spent on the work. About how he actually assesses his company's audit fee he commented "the auditor starts with his records, and if the conclusion he comes to is reasonable I will accept it and if not I will ask for justification".

The interviews reinforced the view that time spent on the audit work represents the largest element in the audit fee, and that it was mainly the auditor's concern to determine how much time they need for the audit work. In addition to time, the quality of the company's internal control system, the market forces, the risk and the responsibility involved in the audit work were also important determinants of audit fees.

The size factors:

The size factors which always significantly affected the scope of the audit work according to all auditors interviewed were stocks & work in progress, turnover, debtors, creditors, total assets, loans, share capital and reserves, current assets, trading profit, and profit before tax. If they are large they could have a great influence on the amount and complexity of the audit work. One auditor commented that "turnover is always a large figure therefore, the risk of even 4% error in turnover can result in 300% error in profits".

Profit before tax was considered as a key figure, one auditor indicated that "profit is a critical figure, especially if there is major fluctuation in this figure from year to year i.e., if the company achieved profits of e.g., £8 m last year whereas this year made a loss of £10 m or vice versa. Such major changes will need interpretation and consequently more audit work.

In general, all the auditors believed that the audit fee increases as the size of the company increases, but it will not increase pro rata to increases in the company size e.g., if the company gets bigger as measured by turnover, stocks, etc., the audit fee as a percentage of these measurements would decrease.

On the other hand, it is important to note that the complexity within each factor could increase the impact of the size on the amount and complexity of the audit work. In other words, company size (in terms of stocks, turnover, debtors, creditors, etc.) by itself may not always be a significant factor. Another auditor commented that "a company could have thousands of customers, but none of them has any individual

significance, whereas another company may have 40 major customers, representing 80% of the debtors. In this case debtors would need more time to audit". However he added that generally, the degree of the complexity varies among companies depending on their business. For example, stocks & work in progress in a retail situation could be relatively easy to audit whereas in other areas like manufacturing and construction, stocks could be a big problem.

One auditor however seemed to disagree with the majority view as contained in the literature and felt that some of the size factors such as cash and fixed assets would have little impact on the amount of the audit work, as they are considered "easy to audit". Therefore, he did not regard current assets or total assets as being important.

The number of employees and total employment costs seemed to be significant to auditors who believed that a company with a large number of employees, and high employment costs would see this reflected in audit fees. One auditor commented that "if the company is paying a high amount of money in employment costs, and is working in a high tech industry, such companies usually have high audit risk associated with it, and therefore auditors expect to charge higher fees".

The finance director indicated that, identifying the most important size factors is mainly the auditors' problem. The auditor investigates these items and determines what work he has to do on the various bits of the client's accounts. From his company's point of view stocks were the most important size factor to be considered. However, if such an item was well controlled by the company then less time would be needed by the auditors. In other words, the more he pays for the internal audit the less he pays for the external audit.

The complexity factors:

The factors which represented the most important complexity factors according to all interviewees were namely, number of countries in which the company operates, number of the company's principal subsidiaries, computerization of accounting records, centralization of financial control, nature of company's business, location of plants, number of product lines, and type of industry. Such factors were believed to have a direct impact on the amount of the audit work. However one auditor felt that although the number of the company's principal subsidiaries was believed to have a direct impact on the scope of audit work, it might not always be a major consideration if the subsidiaries were well controlled.

Similarly, although the high level of computerization of the company's accounting records was believed to reduce the scope of the audit work, nevertheless, "unless the company with an advanced computer system is well controlled, there are big risks because usually complicated procedures can go wrong easily, and in such a situation auditors may need more time to check that the computer system is working properly". From the finance director's point of view, if the auditors were not qualified and trained for such sophisticated computerized records, then time would increase but this should be borne by the auditor.

The nature of the company's business was considered as an important factor, due to the degree of risk involved in each business as mentioned earlier when discussing the main and fairest method in the determination of audit fees.

The other factors:

Two auditors believed that the size and reputation of audit firms are important factors, and generally, big firms charge higher fees than small firms. The reason they gave was the staff rate per hour in big firms is higher than in small firms. Conversely, the third auditor believed that neither the size, nor the reputation of the audit firm is an important factor. He commented "if I want to have a pair of good quality leather shoes I can either go to a big famous shoe shop, or to a small Italian shoe shop, and I still get a good quality shoes". The finance director indicated that if the company has a large number of subsidiaries and operates in many different countries then it would need one of the big audit firms because of their ability to offer an international service.

The reputation of the company was considered an important factor. Two auditors believed that as a general rule the reputation of the company was an indication of the quality of its internal control i.e., the company with a good reputation has a high level of financial control which usually leads to a lower audit fee, and they also believed that sometimes the level of audit fees could be reduced in order to audit a prestigious client. The third auditor and the finance director believed that the reputation of the company had no impact on the level of audit fees.

Generally, the date of the companies' year end was considered an important factor, and auditors thought that they would offer a lower fee to companies which always had their audit done during the quieter or less busy period (July - December), but they would charge their normal or usual price during the busy period (January - June). The finance

director believed that whether the auditors were busy or not it is their problem, and they should spread out their work during the year and not reflect this in different prices for different year-ends.

As expected, the probability of obtaining non audit work was considered by all interviewees as an important factor, which would lead usually to a lower audit fee.

Continuity of the client was also believed to be an important factor affecting the level of audit fees by all interviewees. One auditor commented that "a client who is willing to give the auditor many years of business usually has a slightly lower fee than the client who desires a quick service and may not come back once more". Therefore, they believed that a change of audit appointment very often leads to a higher level of fee.

The above "other factors" i.e., size and reputation of the company, reputation of the audit firm, date of company's year-end, probability of obtaining non audit work, and continuity of client in addition to the previous three factors i.e., quality of the company's internal control system, the competition in the audit market, and the risk involved in the audit work will be included in the final questionnaire under other factors.

Finally, it should be noted that although the interviews were conducted with a small number of interviewees, and the comments have to be interpreted accordingly, these meetings were primarily useful in clarifying the final questionnaire and identifying the most important factors for further inclusion in it. These factors represented areas where differences in opinion did emerge, and while the small number of

interviewees did not enable any statistical significance to be given to this it did raise the desirability of some future research being undertaken on the perceptions of auditors and auditees on the audit process.

The survey factors:

Most of the factors identified through the literature review as stated in the fourth section of chapter three were included in the final questionnaire. In addition, two new factors were introduced through the personal interviews i.e., number of employees and total employment costs. Other factors were excluded for different reasons such as, difficult to collect (e.g., number of audit reports issued annually by company), or covered by other factors (e.g., responsibility which is covered by the risk factor), or because they were considered unimportant by all interviewees (e.g., cash, current assets, and special consideration to a new client).

The following were therefore chosen as the survey factors:

The size factor is represented by the size of the following items: turnover, trading profit, profit before tax, stocks and work in progress, debtors, total assets, current liabilities, creditors, loan capital, share capital & reserves, number of employees, and total employment costs.

The complexity factor is represented by number of the company's principal subsidiaries, number of the countries in which the company operates, number of product lines, location of plants, nature of company's business, type of industry, degree of centralization of financial

control, and degree of computerization of accounting records.

The other factors include the quality of the company's internal control system, competition in the market for audit services, the probability of obtaining non audit work, the date of company's year end, the continuity of client, the size of audit firm, the reputation of audit firm, the reputation of company, and the risk which the auditor accepts.

5.2 RESULTS AND DISCUSSION OF THE COMPANIES' QUESTIONNAIRE:

Of the one hundred questionnaires mailed to companies (which consisted of the 65 companies of the statistical analysis plus 35 others) 53 overall usable responses were received as indicated in table 5.1.

Companies sample size	Response rate
100	53%

Table 5.1

The companies' sample size and its response rate

The companies' questionnaire response rate indicates the keen interest of finance directors regarding the issue of audit fees. As generally the response rates are likely to be in the region of 30 - 50%, (Kerlinger 1973³⁵, and Nachmias 1981⁶⁷).

A number of reasons were given with the uncompleted questionnaires by finance directors who regretted being unable to reply, such as any meaningful response could not be given on a simple yes or no basis, or it is our policy not to take part in these research studies, and we cannot respond to such a request because our staff would spend an enormous amount of their time completing the questionnaire.

The following is a detailed analysis of the respondents opinions about audit fees and its determinants. When discussing each response the question number is reported between brackets for ease of reference back to appendix (1).

The annual audit fee and non - audit work (1):

In accordance with the study limitation to concentrate on the audit fees paid by companies to their auditors for routine audit work, and also to check the audit fees data provided in the published sources such as the companies annual reports, respondents were asked to indicate if their audit fees stated in their annual report represented the annual audit fees alone or whether it included other costs of non - audit work such as accounting, taxation or management consultancy services.

Responses to the questionnaire revealed that the audit fees for most companies i.e. 48 companies (90.5%) do not include any other costs, whereas for 4 companies (7.5%) the audit fees include costs for non audit work (these companies are not in the statistical analysis sample). One company (2%) gave no answer to this question. In general this result was expected as the survey sample consisted of large companies which usually disclose their annual audit fees in their reports.

The initial audit engagements / The main reasons for changing auditors (2):

This study is based on 1983 data, and for the purposes of the study the initial audit engagements are excluded from the analysis as indicated in the introduction (research limitations). Therefore, it was important to check this information by asking the respondents to indicate if they had changed their audit firms during the past three years, and to specify exactly which year. In fact it was preferable to list the three following years 1983, 1984, and 1985 for an easy response. Another purpose of this question was to identify the reasons why companies had

changed their auditors.

The survey revealed that 47 of the companies (88.5%) did not change their auditors during the past three years. Five companies (9.5%) changed their auditors once in different years other than 1983 because of being taken over, to reduce cost, to improve the level of the service, or because the consolidation of audit under one firm capable of providing comprehensive and quality financial services world wide would be better than a number of joint auditors. One company (2%) gave no answer to this question. There is apparently little tendency therefore for large companies to regularly change their auditors.

The "reasonableness" of audit fees (3):

To obtain the finance directors' opinions about the level of audit fees they pay as compared with the size and complexity of their companies, respondents were asked to select between three alternatives i.e., high, reasonable, or low. The answer to this question was overwhelming "reasonable" i.e the audit fee was considered reasonable by the vast majority of companies i.e., 42 companies (79%), whereas none considered it low. Nine respondents (17%) indicated that their audit fees were high, and they mentioned some suggestions which could be done to hold their fees down such as co-operation both by the company and the external auditor in terms of using effective internal audit staff, and better external audit planning and control. Another alternative was increasing pressure on audit managers to minimize costs. One finance director commented "squeeze the auditors and tell them how much you proposed to pay". Two companies (4%) gave no answer to this question. Generally, it could be concluded that while companies are satisfied with the fees they pay to their auditors in a competitive market the fact

that (17%) felt that their fees were high does indicate the need for cost awareness and the scope for practice development protection.

The main method in the determination of audit fees (4):

Respondents were asked what main method they believed was used in determining their companies' audit fees, is it the time spent by the auditor and his staff?, the time plus other factors?, or others?. The survey results as summarized in figure 5.1 showed that 41 respondents (77%) indicated that time spent by the auditor and his staff was usually the basic determinant of the fees they pay; i.e they depend on the anticipated hours and no variance is allowed except in very special circumstances such as a change in group structure e.g., acquisitions and disposals, or major accounting policies such as CCA.

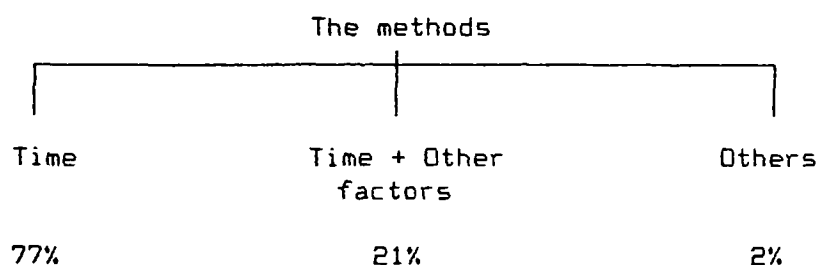


Figure 5.1

The companies' main method in determining audit fees

Eleven companies (21%) used time plus other factors in determining their audit fees. The following table 5.2 lists the factors often mentioned by finance directors in determining audit fees (in addition to the time), and the number of occurrences that each factor was mentioned.

Factors	Number of occurrences
Complexity of the operations	4
Skills & experience of audit staff	2
Market Pressure	2
Quality of the company's internal control system	1
Previous fees	1
Risk & responsibility involved in the audit work	1
Development of audit techniques and progress	1

Table 5.2

Factors mentioned by finance directors in determining audit fees

One finance director (2%) indicated that negotiating the fee with the auditor was the method used in fixing it i.e., the auditors propose their fees and we reduce their proposals to the minimum.

The answers to the above question gave an indication that time is the major factor to be considered when determining the audit fee from the majority of companies' point of view (77%) whereas, for the minority of companies (21%) the complexity of the operations is another major factor to be considered in addition to the time.

The fairest method in the determination of audit fees (5):

Answers to question five as presented in the following figure 4.2 revealed that time spent by the auditor and his staff was regarded as a fair basis in determining the audit fees by 28 companies (53%), whereas

time plus other factors was the fairest method for 23 companies (43%). Again negotiating the fee with the auditor was the fairest method for the same finance director (2%). One respondent (2%) gave no answer to this question.

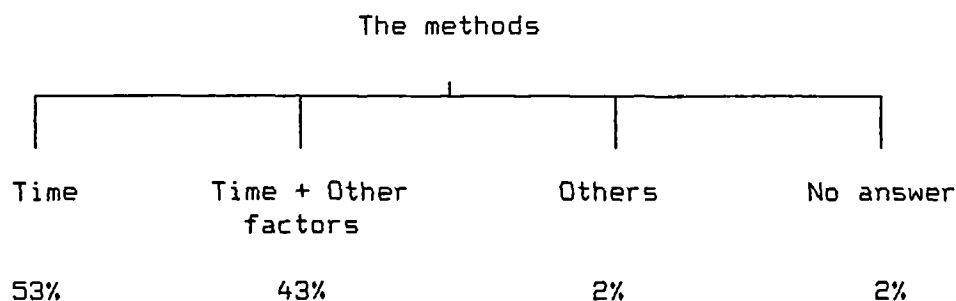


Figure 5.2

The companies' fairest method in determining audit fees

Comparison between the results of questions four and five regarding the two methods (time & time plus other factors) as shown in table 4.3 indicates that although time spent by auditors and audit staff was a common method used by 77% of the companies, nevertheless, it was considered the fairest by only 53%. In contrast, time plus other factors was used by 21% of the companies in determining the audit fee, and it was chosen by 43% to be a fair method in determining it.

The methods			
Time		Time plus other factors	
was used in determining the fee by	was considered as the fairest method by	was used in determining the fee by	was considered as the fairest method by
77%	53%	21%	43%

Table 5.3

Comparison between the results of questions 4 & 5 regarding the two methods time & time plus other factors (companies questionnaire)

The results in the above table 5.3 indicate that not all companies where time is their basic factor in determining their fees i.e., 77% believed it is the fairest method, as 24% (i.e., 77%-53%) of them believed that time plus other factors is the fairest. Therefore, it could be concluded that while time is the most common method in determining the audit fee, however, time by itself is not necessarily regarded as producing a fair fee.

Choice of the big audit firm (6):

The survey results revealed that 91% of companies are audited by the big ten firms. This was not surprising given the nature of the survey sample which consisted of large companies which are always expected to be audited by one of the big firms. The following are the reasons given by finance directors for using such firms:

Quality guarantee (efficiency):

The ability to handle complex problems of large companies and to react to special exercises because of their greater resource availability in terms of calibre staff, technical expertise, specialist skills, and up to date knowledge of accounting standards.

Worldwide services:

The ability to service companies with a wide geographical spread because of their national and international of offices.

Prestige:

Another subjective advantage which influenced the choice of a big firm was the firm's 'name' or the prestige which would make it acceptable to shareholders and city institutions.

Additionally, large firms were preferable because of their better services in non-audit areas or their technical back up support and

advice on matters outside audit. For these reasons small audit firms are not regarded as able to cope with the size and complexity of the audit of large companies.

The size factors (7.A):

To identify the most important size factors affecting the scope of audit work, and hence the level of audit fees, respondents were given a list of twelve factors and asked to assess the importance of each factor, to rank the four most important factors, and to indicate how does the company size in general affect the level of audit fees. Respondents were also given the opportunity to comment on or to specify any other factors they believed could strongly influence fee determination.

Determining the most important size factors was a relative matter i.e. the very important factors to some respondents were considered important or unimportant to others. However, the twelve size factors listed in order according to their importance (i.e. number of occurrences that each factor was selected as one of the four most important size factors) are presented in the following table 5.4, which shows a clear overall ranking of importance. The table also shows number of occurrences that each factor was selected as the first, second, third, and fourth of the four most important size factors.

Factors / No. of occurrences as one of the 4 most important size factors		No. of occurrences as the			
		1st	2nd	3rd	4th
1. Stocks & Work in Progress	38	17	10	7	4
2. Turnover	33	15	11	4	3
3. Total assets	27	10	9	7	1
4. Debtors	17	0	6	7	4
5. Creditors	15	0	0	6	9
6. Profit before tax	14	2	4	1	7
7. Trading profit	14	3	6	3	2
8. Current liabilities	12	0	1	8	3
9. Share capital & Reserves	9	1	1	3	4
10. No. of employees	6	0	1	2	3
11. Employment costs	3	0	1	0	2
12. Loan capital	3	0	0	1	2
Others:					
13. Size of company's tax bill	2	1	0	1	0

Table 5.4

The size factors in order according to their importance
(as determined by finance directors)

The results in table 5.4 indicate that stocks is the most important size factor affecting the scope of audit work, as it was selected 38 times as one of the four most important factors, and 17 times as the first most important. The factors (stocks, turnover, total assets, debtors, and creditors) represent the five most important size factors, which suggest that such areas may include a number of issues which affect time and complexity of the audit work. Therefore, the size of audit work could

be influenced if these items are large. Conversely, share capital & reserves, number of employees, total employment costs, and loan capital are the less important factors to be considered, which would suggest that they are easier to audit and tend to be always well controlled. Such results are mainly compatible with those from the statistical analysis as will be seen in chapter six, which confirmed the importance of the factors stocks & work in progress, turnover, debtors, and creditors in affecting audit fees (as a group), whereas debtors and total employment costs (which has a low ranking by companies) were the most significant size factors (as individuals).

The size of the company's tax bill was an additional factor mentioned by two respondents as one of the four most important size factors, and it was selected once as the first, and once as the third most important size factors.

Regarding the general effect of the company's size on the level of audit fees, the survey revealed that 51% of the respondents indicated that large companies would pay higher fees, whereas 36% believed that large companies could have relatively lower fees. Only 10% noted that the company size have little or no effect, and 3% did not respond to this question. On the other hand it was found that small companies should have lower fees according to almost half of the responses (45%). In contrast, 38% thought that small companies could pay higher fees. 13% said that the fee was not influenced by the company size, and 4% did not respond to this question. The previous results are summarized in the following table 5.5:

Company size			
Large company		Small company	
Effect on fee	Response%	Effect on fee	Response%
Higher	51%	Higher	38%
Lower	36%	Lower	45%
No effect	10%	No effect	13%
No response	3%	No response	4%

Table 5.5

The general effect of company size on the level of audit fees
(as determined by finance directors)

From inspection of the previous table one can draw the conclusion that in general, large companies should pay higher fees whereas smaller companies should pay lower fees. Nevertheless, large companies could have relatively lower fees i.e., audit fees as a percentage of sales' size, assets, etc., is lower than in smaller companies. The apparent reason could be that usually large companies are well controlled, which could decrease the amount of audit work needed, and consequently the level of audit fees (and vice versa). In addition, with large companies audit firms can enjoy economies of scale which could be reflected on a reduction of the level of audit fees. Finally, it could also be said that as a group finance directors apparently have no clear idea about how size should affect their audit costs, which implies that they may not have clear idea about audit costs in general.

The complexity factors (7.B):

There was a general agreement between finance directors regarding the

four most important complexity factors as will be seen in table 5.6, which lists in order the eight complexity factors according to their importance (i.e., number of occurrences that each factor was selected as one of the four most important complexity factors). The table also shows the number of occurrences that each factor was selected as the first, second, third, and fourth most important complexity factors.

Factors / No. of occurrences as one of the 4 most important complexity factors		No. of occurrences as the			
		1st	2nd	3rd	4th
1.No. of countries in which the company operates	44	14	23	3	4
2.No. of principal subsidiaries	40	23	6	7	4
3.Degree of centralization of financial control	30	5	3	10	12
4.Degree of computerization of accounting records	27	2	9	6	10
5.Nature of co.'s business	19	4	1	3	11
6.Location of plants	10	0	1	8	1
7.Type of industry	10	1	1	5	3
8.No. of product lines	8	1	2	4	1
Others:					
9.Changing in cos.' structure	1	1	0	0	0
10.Complexity of transactions	1	0	1	0	0

Table 5.6

The complexity factors in order according to their importance
(as determined by finance directors)

The results presented in the above table 5.6 indicate that the number of countries in which the company operates, number of the company's principal subsidiaries, degree of centralization, and degree of

computerization are clearly the four most important complexity factors. which could indicate that such factors directly affect the amount and complexity of the audit work e.g., the larger the number of countries in which the company operates (multinationality of company), the more difficult the audit work, that could be due to different reporting requirements in different countries, and foreign currency translation problems between different countries and parent company. In addition, a company with a large number of subsidiaries, decentralized financial control, and low level of computerization certainly would affect the scope and complexity of the audit work. The importance of the factors number of subsidiaries, and number of countries in which the company operates was also confirmed as will be seen in the statistical analysis (chapter 6). Location of plants, type of industry, and number of product lines were the last factors to be considered, which could mean that they do not have a great influence on the amount of audit work. For example, because the auditor does not have to visit every plant regularly, location of plants may not be an important factor. Similarly, type of industry may not be a major consideration because auditing is a similar art in any industry as most of the principles are the same i.e., if the auditor audits an oil or mining company it is also possible for him to audit a chemical or steel company, and similarly if the company has a variety of product lines.

Other factors were mentioned and considered as one of the four most important complexity factors, i.e, the complexity of the company structure, and the changes in the company structure over a period which was selected once as the first most important complexity factor. The complexity of the individual transactions was another factor considered once as the second most important complexity factors.

The other factors (7.C):

Not only the size and complexity factors apparently affect the fee determination, the survey revealed that some other factors are also important elements in the fee. Table 5.7 lists in order the 'other factors' according to the same criterion used before with size and complexity factors i.e., number of occurrences that each factor was selected as one of the four most important 'other factors'. The table also shows number of occurrences that each factor was selected as the first, second, third, and fourth of the four most important size factors.

Factors / No. of occurrences as one of the 4 most important "other factors"		No.of occurrences as the			
		1st	2nd	3rd	4th
1.Quality of internal control	39	27	7	2	3
2.Continuity of audit firm	25	4	7	10	4
3.Reputation of audit firm	23	2	7	6	8
4.Reputation of company	21	0	2	10	9
5.Competition in the market for audit services	17	3	7	5	2
6.The audit risk	14	2	3	4	5
7.The need for non audit work	9	1	3	4	1
8.Date of company's year end	5	0	2	1	2
Others:					
9.Level of bargaining power	1	1	0	0	0
10.Competition for highly qualified accountants	1	0	1	0	0

Table 5.7

The 'other factors' in order according to their importance
(as determined by finance directors)

From table 5.7 it is obvious that the quality of the company's internal control system is the most significant factor, as it was selected by the vast majority of companies (39 times) and it was selected 27 times as the first most important. Size of the client in terms of level of bargaining power is an additional factor mentioned by one respondent who considered it as an important element in the fee determination. In addition, the competition for highly qualified accountants from high paying institutions is another factor believed to increase the level of audit fees by another respondent.

The impact of the 'other factors' on the level of audit fees is presented in table 5.8, which summarizes the results according to number of occurrences that each factor affects the audit fee in terms of higher fee H, lower fee L, or no effect N.

lower audit fee.

- The competition in the market for audit services was believed to decrease the level of audit fees.
- The need for non audit work, and the date of company's year end (busy or non busy) are generally believed to have no effect on audit fees.
- The continuity of audit firms leads to a lower fee. In contrast, changing the audit firm leads to a higher audit fee.
- The reputation of audit firm was believed to result in a higher fee.

Finally, it is worth noting that the fifty three usable responses to the companies' questionnaire succeeded in identifying the major factors (size, complexity, and others) affecting the level of audit fees. That is from the majority of the finance directors' point of view the factors stocks and work in progress, turnover, debtors, creditors, and total assets are the most important size factors whereas number of principal subsidiaries, number of countries in which the company operates, degree of centralization of financial control, degree of computerization of accounting records, and nature of company's business are the five major complexity factors. Finally, the quality of the company's internal control system represents the most important other factors affecting the amount of audit work and consequently the level of audit fees.

(Summary of the responses to companies' questionnaire is presented in appendix 3).

5.3 RESULTS AND DISCUSSION OF THE AUDIT FIRMS' QUESTIONNAIRE:

Of the 100 questionnaires mailed to audit firms 23 responses were received as shown in the following table 5.9.

Audit firms sample size	Response rate
100	23%

Table 5.9

The audit firms' sample size and its response rate

A significant percentage of auditors declined to participate in the survey. Although the auditors' questionnaire was shorter than the companies', its response rate was far lower as shown in table 5.10. The main explanations given with the uncompleted questionnaires were the auditors' lack of time, and it is not their practice to be involved in such research. Generally, the poor response rate of the auditors' questionnaire might indicate that finance directors are either more interested in the audit fee determination than auditors or that auditors regard this as too sensitive an issue for public discussion.

Questionnaire	Length of questionnaire		Response rate
	No. of pages	No. of questions	
Companies	6	7	53%
Audit firms	5	3	23%

Table 5.10

Comparison between companies & audit firms' response rate

Against the belief that the shorter the questionnaire the higher the response rate, the results in table 5.10 has shown a negative relationship between the questionnaire length and response rate. Berdie 1973⁷, and Kanuk & Bernson 1975³⁴ studies indicated that questionnaire length is not related to response rate. However, the issue of the questionnaire length continues to be important to present day researchers. Because of the low response rate of the auditors questionnaire it could not be used to generalize the results over the auditors.

The main method in the determination of audit fees (1):

The majority of the auditors i.e., 15 auditors (65%) indicated that they depend on the time plus other factors in determining their audit fees whereas, only 8 auditors (35%) depend on the time alone as shown in figure 5.3.

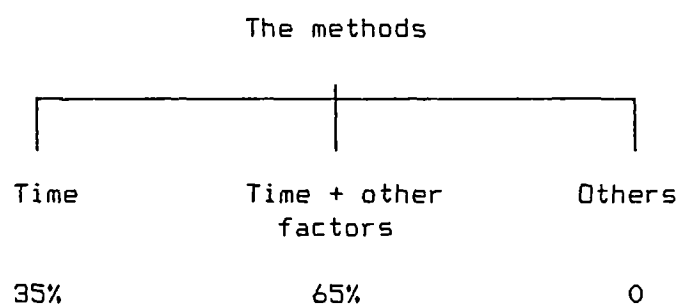


Figure 5.3

The audit firms' main method in determining audit fees

The following table lists the factors often mentioned by auditors in determining audit fees (in addition to the time), and the number of occurrences that each factor was mentioned.

Factors	Number of occurrences
The risk involved in the audit work	5
Complexity of the assignment	4
Competition in the audit market	2
Probability of obtaining non audit work	2
Skills and experience of audit staff	2
Ability of client to pay	2
Previous fee plus inflation	1
Size of transactions	1
Degree of responsibility	1
Co operation of client staff	1
Time constraints (busy period)	1
The client position	1

Table 5.11

Factors mentioned by auditors in
determining audit fees

Comparison of the results of companies and audit firms' questionnaires regarding the main method time T, time plus other factors T+O, and others O in determining audit fees is presented in table 5.12. It revealed that generally, from the companies' point of view time spent in the audit work is the main method of determining the audit fee whereas, time plus other factors is the main method from the auditors' point of view.

	The methods		
	T	T + O	O
Of the 53 responses of cos.'questionnaire	77%	21%	2%
Of the 23 responses of firms'questionnaire	35%	65%	0

Table 5.12

Comparison of companies and audit firms' results regarding the main method in determining audit fees

The fairest method in the determination of audit fees (2):

The results of the survey revealed that 78% of auditors considered time plus other factors as the fairest method in determining an audit fee, whereas time was believed to be the fairest by 22% as shown in figure 5.4.

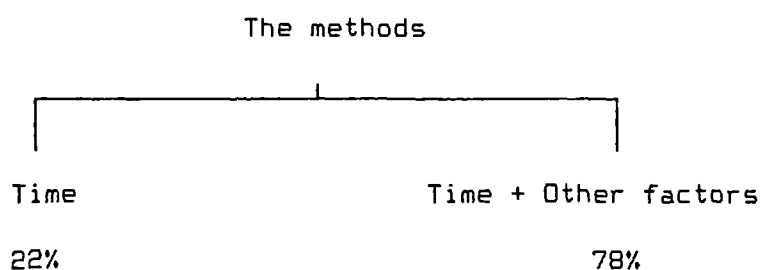


Figure 5.4

The auditors'fairest method in determining audit fees

The above result does not support the previous result of the companies questionnaire as seen in table 5.13. The majority of finance directors believed that time is the fairest method, whereas, the majority of auditors believed that time plus other factors is the fairest.

	Methods			No response
	T	T+O	O	
Of the 53 responses of cos.'questionnaire	53%	43%	2%	2%
Of the 23 responses of firms'questionnaire	22%	78%	0	0

Table 5.13

Comparison of companies and audit firms' results
regarding the fairest method in determining audit fees

Comparison between the results of questions one and two as presented in table 5.13 regarding the two methods time and time plus other factors revealed that although 35% of auditors depend on time in determining their fees, only 22% believed that it is the fairest method. In contrast, time plus other factors was used by 65% of auditors and it was chosen by 78% to be the fairest method.

Methods			
Time		Time plus other factors	
was used in determining the fee by	was considered as the fairest method by	was used in determining the fee by	was considered as the fairest method by
35%	22%	65%	78%

Table 5.14

Comparison between the results of questions 1 & 2 regarding
the two methods time & time plus other factors
(auditors questionnaire)

The main conclusion that could be drawn from the above table is that not all the 35% of auditors who depend on time in determinig their fees believed it is the fairest method, but 13% of them (35%-22%) believed

that time plus other factors is the fairest. Such conclusion confirmed the previous conclusion drawn from the companies' questionnaire results, which mean that the determination of audit fee is a product of number of factors in addition to the time.

The size factors (3.A):

Results of auditors questionnaire regarding the size factors is presented in the following table.

Factors / No. of occurrences as one of the 4 most important size factors		No. of occurrences as the			
		1st	2nd	3rd	4th
1. Turnover	16	8	6	0	2
2. Stocks and work in progress	13	5	3	3	2
3. Debtors	8	0	2	1	5
4. Total assets	7	2	2	2	1
5. Creditors	6	0	2	3	1
6. Trading profit	5	1	2	1	1
7. Current liabilities	4	0	0	2	2
8. Profit before tax	4	0	0	3	1
9. Share capital and reserves	4	0	0	3	1
10. No. of employees	3	0	1	0	2
11. Loan capital	2	1	0	0	1
12. Employment costs	1	0	0	1	0
Others:					
13. Size of company's transactions	1	1	0	0	0

Table 5.15

The size factors in order according to their importance
(as determined by auditors)

The results in the above table 5.15 confirmed the previous results of the companies as it emphasized the importance of the first five factors (i.e., turnover, stocks, debtors, total assets, and creditors). They also confirmed the less importance of the factors share capital & reserves, number of employees, loan capital, and total employment costs.

Regarding the general impact of the company size on the level of audit fees, the results in the following table 5.16 revealed that 44% of auditors indicated that company size (large & small) has no effect on the level of audit fees. 39% believed that large companies would have higher fees, whereas, 13% believed that large companies could have relatively lower fees. 4% did not respond to this question. On the other hand it was found that 35% of auditors think that small companies would pay lower fees. 17% indicated that small companies would pay higher fees. Again 4% gave no answer to this question.

Company size			
Large company		Small company	
Effect on fee	Response%	Effect on fee	Response%
Higher	39%	Higher	17%
Lower	13%	Lower	35%
No effect	44%	No effect	44%
No response	4%	No response	4%

Table 5.16

The general effect of company size on audit fees
(as determined by auditors)

The complexity factors (3.B):

In respect of the complexity factors, the auditors responses as summarized in the following table 5.17 confirmed the results of the companies' regarding the importance of the first six factors i.e., number of the company's principal subsidiaries, number of countries in which the company operates, degree of computerization of accounting records, degree of centralization of financial control, nature of company's business, and location of plants.

Factors / No. of occurrences as one of the 4 most important complexity factors		No.of occurrences as the			
		1st	2nd	3rd	4th
1.No.of principal subsidiaries	14	7	4	1	2
2.No.of countries in which the company operates	13	3	3	4	3
3.Degree of computerization of accounting records	12	1	3	5	3
4.Degree of centralization of financial control	11	4	3	1	3
5.Nature of co.'s business	7	1	3	2	1
6.Location of plants	5	0	1	1	3
7.No. of product lines	4	0	0	1	3
8.Type of industry	4	0	0	3	0

Table 5.17

The complexity factors in order according to their importance
(as determined by auditors)

The 'other factors' (3.C):

From the auditors' point of view the quality of the company's internal control system is the most important 'other factors' to affect the level of audit fees (this result confirmed the companies' result regarding this factor), followed by the probability of obtaining non audit work such as accounting, taxation, or management consultancy services, the risk which the auditor accepts, the continuity of client, the date of company's year end, the reputation of company, the size of audit firm, and the reputation of audit firm. Table 5.18 lists the "other factors" in order according to their importance.

Factors / No. of occurrences as one of the 4 most important 'other factors'		No.of occurrences as the			
		1st	2nd	3rd	4th
1.Quality of internal control	14	8	4	2	0
2.Probability of obtaining non audit work	11	0	5	3	3
3.The audit risk	9	2	3	1	3
4.Continuity of client	6	1	0	2	3
5.Competition in the audit market	4	0	0	2	2
6.Date of company's year-end	3	1	0	1	1
7.Reputation of company	3	0	1	1	1
8.Size of audit firm	2	0	1	1	0
9.Reputation of audit firm	2	0	0	1	1

Table 5.18

The 'other factors' in order according to their importance
(as determined by auditors)

The impact of each of the 'other factors' on audit fees from the

auditors' point of view is summarized in the following table 5.19:

The 'other factors'	The impact on fee		
	H	L	N
1. Quality of internal control	0	15	4
2. Competition in the market	0	10	10
3. Probability of non audit work	0	11	10
4. Date of cos.'s year end Busy	5	0	14
Less busy	0	6	13
5. Continuity of client Contin.	0	7	16
Chang.	10	3	8
6. Reputation of audit firm	7	0	12
7. The audit risk	16	0	4
8. Reputation of Company	3	2	14
9. Size of audit firm Big	10	0	5
Non big	0	9	7

Table 5.19

The impact of the 'other factors' on audit fees
(as determined by auditors)

From the above table 5.19 it can be seen that for some factors there was an overlap between the responses such as, the probability of obtaining non audit work, the competition in the market for audit services, the changing auditor, the size of audit firm (big & non big), and the reputation of audit firm.

According to the majority (i.e., number of occurrences that each factor affects audit fees in terms of higher fee H, lower fee L, or no effect N, the following conclusions can be drawn:

- A high level of internal control is believed to reduce the level of audit fees.
- The risk which the auditor accepts will increase the level of the fee.
- The date of company's year end (busy & less busy) as well as the reputation of the company are believed to have no effect on the level of audit fees.

Comparison between the results of companies and audit firms:

The following table 5.20 compares the results of both companies and audit firms' questionnaires regarding the most important size, complexity, and other factors.

Companies' results	Audit firms' results
<u>Size factors:</u> 1.Stocks and WIP 2.Turnover 3.Total assets 4.Debtors 5.Creditors	<u>Size factors:</u> 1.Turnover 2.Stocks and WIP 3.Debtors 4.Total assets 5.Creditors
<u>Complexity factors:</u> 1.No. of countries in which the co. operates 2.No. of principal subsidiaries	<u>Complexity factors:</u> 1.No. of principal subsidiaries 2.No.of countries in which the co.operates
<u>Other factors:</u> 1.Quality of internal control	<u>Other factors:</u> 1.Quality of internal control

Table 5.20

Comparison of the results of both companies and audit firms' questionnaires regarding the most important size, complexity, and other factors

Generally, from the above table 5.20 it could be concluded that despite the low response rate of the auditors' questionnaire the results which were drawn from the twenty three responses supported the results of the companies' regarding the most important size, complexity, and other factors.

5.4 SUMMARY OF THE EMPIRICAL STUDY MAJOR FINDINGS :

It is worth noting that the responses to both companies and audit firms questionnaires along with the preliminary interviews succeeded in translating the research objectives into a number of specific factors which were seen to be highly important to the majority of both auditors and finance directors. The following are the empirical study's major findings or the overall generalizations which could be drawn:

— Time spent by the auditor and his staff is the main factor to be considered by finance directors (77%) when determining their audit fees. However, 24% of them believe that audit fee is significantly affected by other factors which should be considered when determining the fee.

— Time plus other factors is the main method used by auditors (65%) in determining their audit fees. In addition, not all auditors who depend on time in determining audit fees (35%) believe it is the fairest. 13% of them believe that time along with other factors is the fairest method.

It could be concluded that time spent on audit work is the most common method in the determination of audit fees, despite the fact that some auditors and finance directors do not consider it by itself as the fairest method.

The following are the major objective and subjective factors which affect directly and indirectly the level of audit fees according to the majority of the responses to both the survey and the personal interviews:

The company size:

The company size is a major consideration in a fee determination, especially when it involves some troublesome areas (i.e., which affect significantly the scope and amount of the audit work). Such areas were identified through the empirical study, and the following five items represent the most important size factors:

- 1 - Stocks & work in progress
- 2 - Debtors
- 3 - Creditors
- 4 - Turnover
- 5 - Total assets

In addition to the above size factors, the two factors number of employees and total employment costs were introduced through the interviews. Although the questionnaire returns gave a low ranking to employment costs it will be shown later (chapter 6) that the statistical analysis highlighted this as one of the most significant factors.

Regarding the impact of the size factors on the level of audit fees, it could be said that generally, large companies pay higher fees than small companies, but it is relatively lower i.e., the audit fee does not increase pro rata to increases in company size. In other words, as the company gets bigger as measured by stocks, turnover, debtors, etc., audit fee gets proportionally lower or as a percentage of these measurements due to the economies of scale.

On the other hand, it is important to note that sometimes the size of the previous factors by themselves may not be significant. The

complexity within each item increase the impact of the large size on the amount and complexity of the audit work, and consequently the level of audit fees.

The complexity of the company:

In respect of the complexity of the company, the following five factors were identified as the most important measures of complexity of the company which significantly affect the amount of the audit work and consequently the level of audit fees:

- 1 – Number of countries in which the company operates
- 2 – Number of the company's principal subsidiaries
- 3 – Degree of computerization of accounting records
- 4 – Degree of centralization of financial control
- 5 – Nature of company's business

The other factors:

In addition to the size and complexity of the company, the following are the three subjective factors which are believed to have a significant effect on the level of audit fees:

- 1 – The level of the company's internal control system was considered one of the most controlling factors which affects directly the scope and cost of audit. Therefore, the assessment of this system is the best starting point in determining audit fees.
- 2 – The degree of the audit risk involved, which could vary depending on the nature of the company's business. There is a strong belief that the business risk in companies in a high tech industry and financial institutions is far greater than other areas, which

could due to the high level of publicity.

3 – Competition in the market for audit services in the U.K. is believed to be strong and severe, not only between the big and small audit firms but also among the big firms, who sometimes reduce their fee to a very low level to win a competitive tender.

Although these size, complexity, and other factors were believed to be significant for most auditors and finance directors, however not all of them are necessarily used in all cases in the same manner. In other words, assessing the degree of their importance or, the weight given to each factor is a relative matter and could vary from one case to another depending on the circumstances.

Therefore, it could be concluded that the audit fee is a product of several objective (quantitative) and subjective (qualitative) factors, In addition, its determination is a highly subjective process which needs many personal judgements in assessing and weighing these factors and in seeking a fair and sound fee.

Generally, finance directors are satisfied with the level of the fees they pay to their auditors, as it was considered reasonable by the vast majority (79%). For the rest of the companies (21%) whose audit fees were considered high they plan to minimize them by:

- Co-operation both by the company and the external auditor in terms of using effective internal audit staff and sufficient internal audit planning.

- Increasing pressure on audit manager to minimize the audit costs.

(Summary of the responses to audit firms' questionnaire is presented in

5.5 THE STATISTICAL ANALYSIS VARIABLES:

The statistical analysis will be conducted using the most important factors identified through the empirical study. However, some of these factors are excluded because they are difficult to quantify, such as some of the complexity factors i.e., degree of computerization of accounting records, degree of centralization of financial control, and the other factors i.e., the quality of the company's internal control system, the degree of the audit risk, and the competition in the market for audit services.

Total assets is also excluded as it is not correct to use both total assets and some of its individual components i.e., stocks & work in progress, and debtors at the same time. In addition, these components were generally considered more important than total assets according to the results of the empirical study. Because all the companies in the study sample are in the manufacturing sector, the nature of the company's business is not taken into account.

Therefore, the following factors represent the statistical analysis variables:

The factors creditors, debtors, turnover, stocks & Work in progress, and total employment costs represent the company size, whereas number of the company's principal subsidiaries, and number of the countries in which the company operates represent the complexity of the company.

CHAPTER SIX

CHAPTER SIX

RESULTS AND DISCUSSION OF THE STATISTICAL ANALYSIS

Introduction:

The main purpose of the statistical analysis in this study is to fit an explanatory model that helps to assess the magnitude of the association between audit fees and the size and complexity of the company.

Most phenomena in social sciences tend to depend on many factors. Therefore, the initial step in the model building process is the specification of the factors or the independent variables thought to be affecting the dependent variable.

According to the previous results of the empirical study through the questionnaire survey and the preliminary interviews, it was decided that the factors: creditors CR, debtors DE, sales turnover SA, stocks & work in progress ST, and total employment costs EMC as size factors, and number of the company's principal subsidiaries SUB, and number of countries in which the company operates CO as complexity factors, were believed to be the most important factors affecting the amount of audit work and consequently the time and the level of audit fees. Such factors represent the independent variables.

Therefore, in building a mathematical model of audit fees the relationship can be expressed by the following function:

$$AR = f (CR, DE, SA, ST, EMC, SUB, CO)$$

Where AR is the dependent variable audit fees, which is a function of other explanatory variables i.e., CR, DE, SA, ST, EMC, SUB, and CO.

To explain the relationship between AR and these variables the type of the function should be specified. A variety of functions can be found to represent various relations (linear or curvilinear function). This will be examined in the first section of this chapter.

This chapter presents the statistical analysis of the data. It includes the following sections:

- 6.1 Results and discussion of the preliminary statistical procedures.
- 6.2 Choice of the statistical techniques and statistical package.
- 6.3 Problem in the analysis (Multicollinearity).
- 6.4 Results and discussion of the principal component analysis.
- 6.5 Results and discussion of the multiple regression analysis.
- 6.6 Further analysis.
- 6.7 Summary of the statistical analysis major findings.
- 6.8 Comparison between the results of the empirical study and the statistical analysis.

6.1 RESULTS AND DISCUSSION OF THE PRELIMINARY STATISTICAL PROCEDURES:

To identify the main features of the data in this study, the following preliminary statistical procedures (scatterplot of the data and correlation analysis) were used as an initial step in the statistical analysis.

1. Scatterplot of the data:

The scatterplot of the data was examined to describe the relationship between audit fees and the variables previously identified (linear or curvilinear). The plot was also made as it could provide information about what type of mathematical function might be appropriate for summarising the data (e.g., parabolic, polynomial, trigonometric). In addition, in many cases the scatterplot could suggest several possible transformations (e.g., logarithmic, square root, and negative reciprocal) to improve the relationship.

The scatterplot suggested that the shape of the relationship between AR and the independent variables is more likely to be curvilinear than linear [apart from EMC which shows a simple linear relationship with AR as shown in figure 6.1].

An example of the curvilinear relationship between AR and SA is given in figure 6.2, which shows that when sales size increases audit fees increase in a curved fashion. In other words, audit fees increase by smaller proportion to sales size.

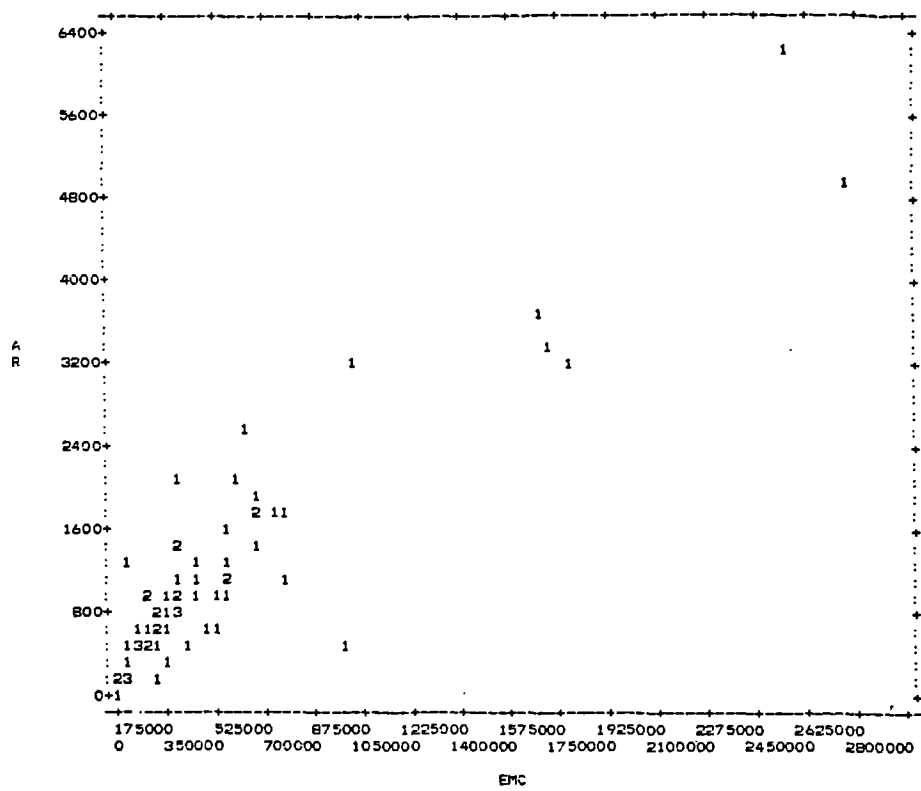


Figure 6.1

A plot of AR versus EMC

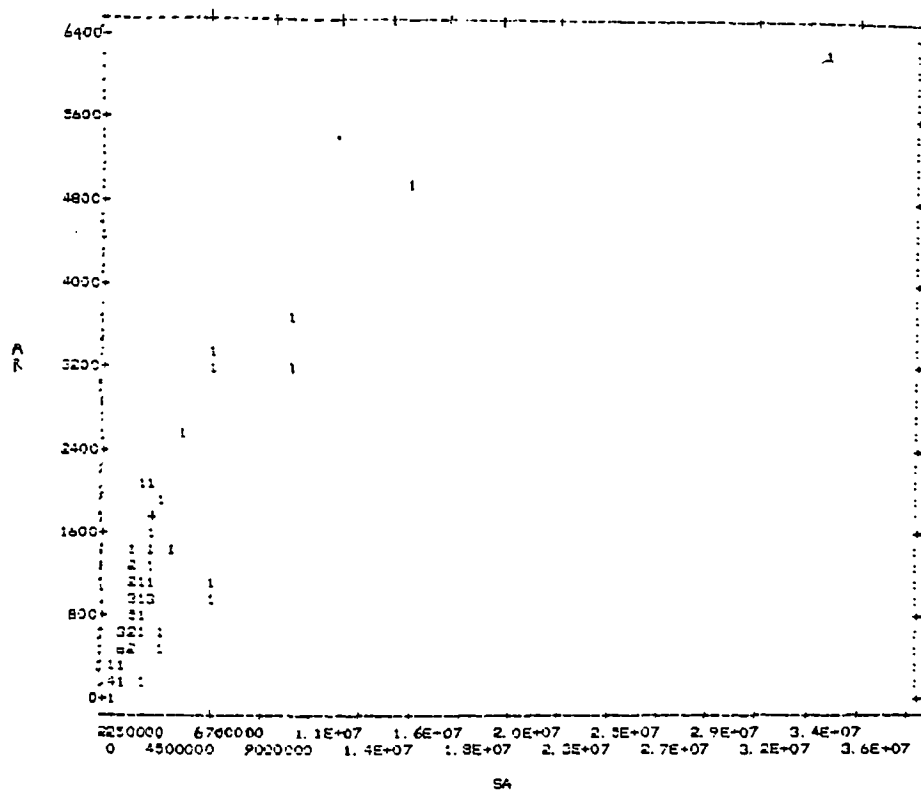


Figure 6.2

A plot of AR versus SA

The obtained relationship in figure 6.2 is compatible with the earlier hypothesis (No.2) stated in the introduction, and the results of both the personal interviews and the questionnaire survey regarding the size factors. It was also anticipated because often in large manufacturing companies such size factors (e.g., sales, assets) are expected to show economies of scale. In other words, audit firms could enjoy scale economies which could be reflected on lower audit fees i.e., doubling the size of these factors could increase the size of audit fees but not double it.

Transformations to linearize the data:

Different kinds of transformations were suggested in order to achieve linearity of the relationship, such as taking logs, negative reciprocals, or square roots, Norusis 1985⁷². These three transformations were applied and the plots of the transformed data revealed that:

- The logarithm transformation $\text{Log}X$ did not linearize the relationship between Y and X , and the curve was reversed, as shown in figure 6.3; this means that log transformation was too strong.
- Similarly, the negative reciprocal $-1/X$ transformation did not improve the relationship between Y and X , as shown in figure 6.4.
- Finally, by applying the square root transformation \sqrt{X} the plot becomes reasonably linear as shown in figure 6.5.

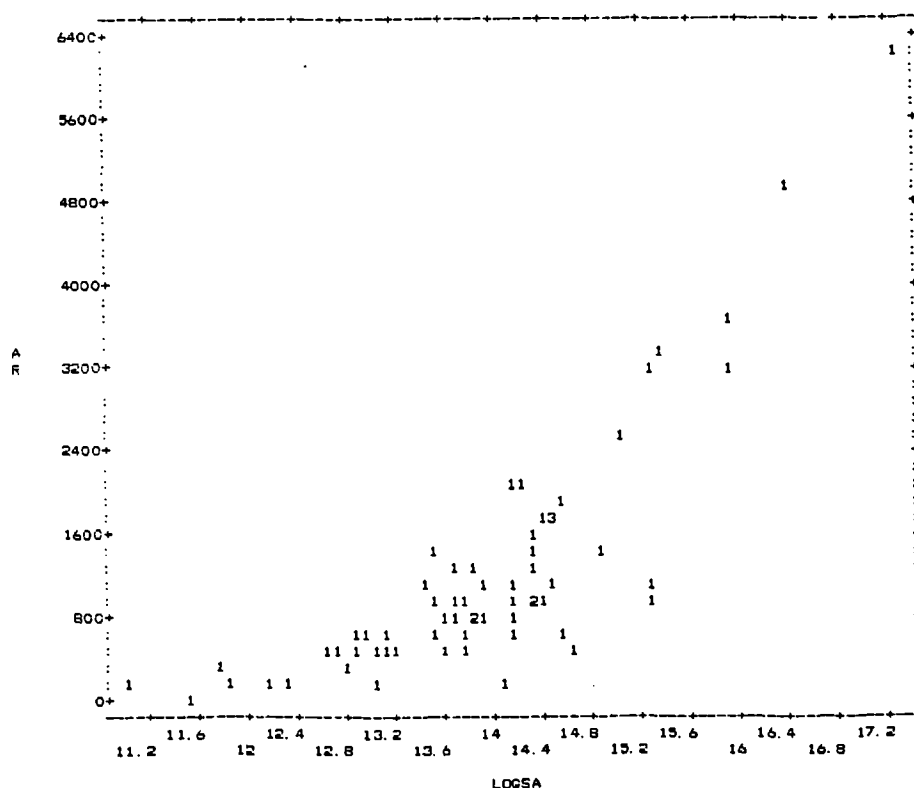


Figure 6.3

A plot of AR versus LOGSA
(using logarithm transformation)

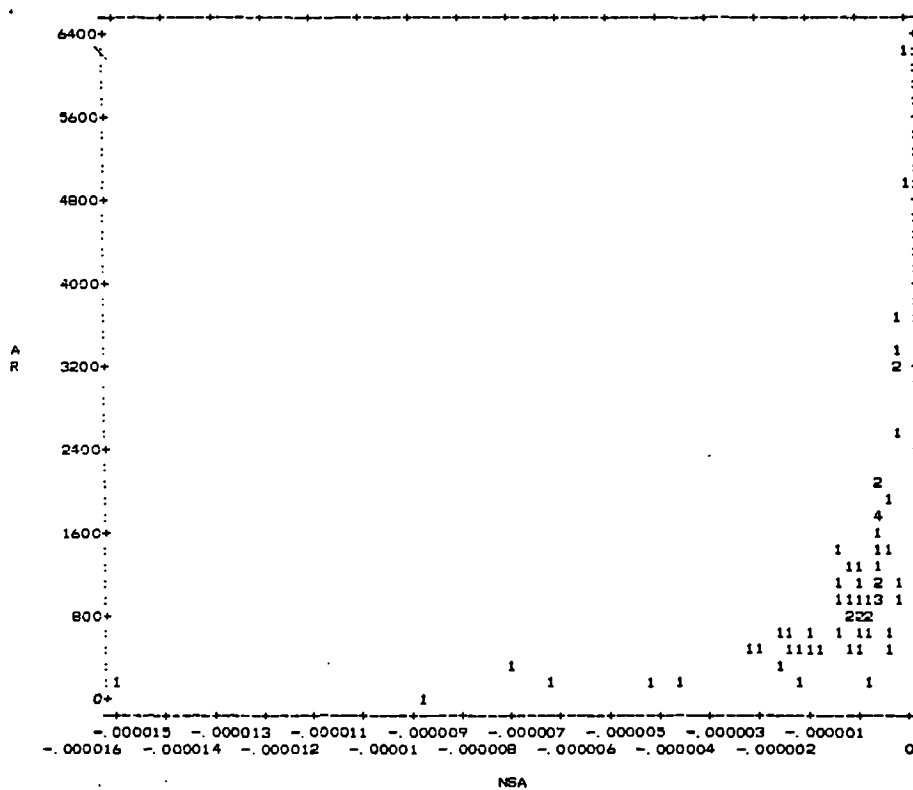


Figure 6.4

A plot of AR versus $-1/SA$
(using negative reciprocal transformation)

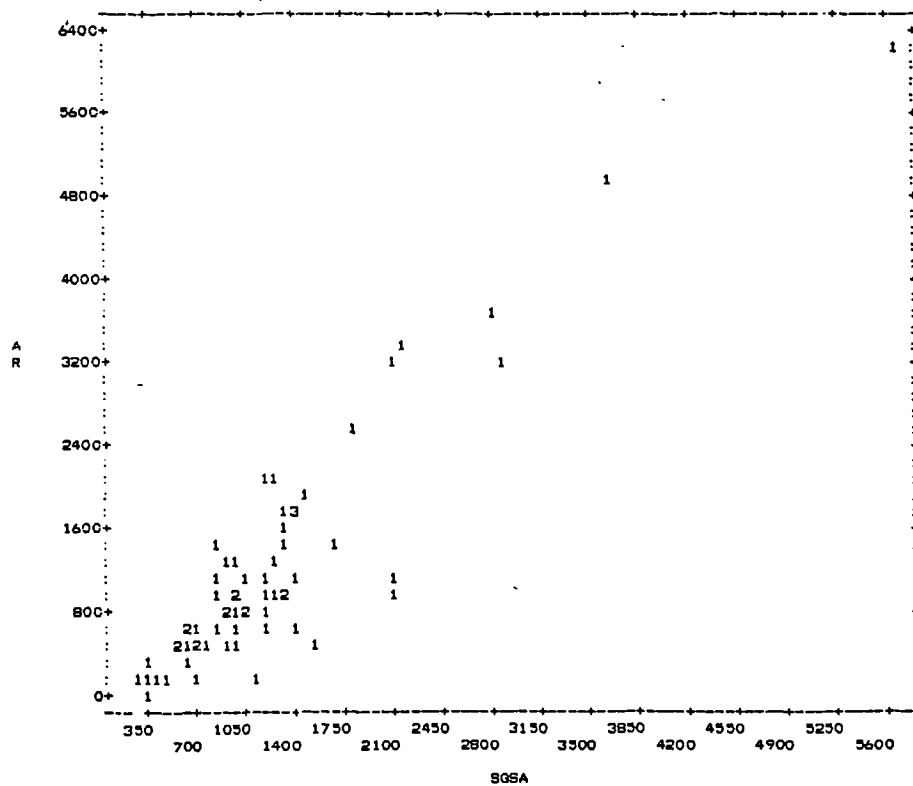


Figure 6.5

A plot of AR versus \sqrt{SA}
(using square root transformation)

2. Correlation analysis:

Correlation analysis was used to highlight the nature and the strength of the association between audit fees as a dependent variable and each independent variable (debtors, creditors, sales, stocks, employment costs, number of subsidiaries, and number of countries), by calculating the pairwise simple correlation coefficients.

Correlation analysis was also carried out on transformed variables using the previous three transformations ($\log X$, \sqrt{X} , and $-1/X$). Table 6.1 displays the calculated correlation coefficients of both untransformed and transformed variables with audit fees to see the impact of the transformations on the correlation coefficients.

Independent variables	Correlation coefficients			
	Untransformed variables	Transformed variables		
		\sqrt{X}	$\log X$	$-1/X$
<u>Size factors:</u>				
Creditors	.88	.89	.77	.33
Debtors	.86	.92	.84	.42
Sales	.84	.91	.81	.41
Stocks	.86	.88	.76	.38
Employment costs	.92	.90	.74	.25
<u>Complexity factors:</u>				
No. of subsidiaries	.53	.52	.46	.29
No. of countries	.49	.45	.38	.22

Table 6.1

The correlation coefficients of both untransformed and transformed variables with audit fees

As expected, the results in table 6.1 indicated that both untransformed and transformed variables have positive relationship with audit fees as stated in the introduction (hypothesis 1). The first set of correlations

of the untransformed variables shows that the first five variables (size factors) have high correlation with audit fees, whereas the last two variables (complexity factors) have relatively smaller correlations. In addition, total employment costs has the highest correlation with audit fees, which means that companies with high employment costs usually pay higher audit fees.

The second set of correlations indicated that the square root transformation improved the correlation with audit fees of the first four size variables. This result confirmed the studies of Elliot & Korpi 1978²⁵ and Taylor & Baker 1981²⁶, that the square root transformation improves the correlation of the size variables with audit fees. The table also revealed that neither the log transformation $\log x$ nor the negative reciprocal $-1/X$ improved the correlation of any of the variables with audit fees.

Conclusion:

The results of the two preliminary statistical procedures regarding the impact of the different transformations on both the linearity of the relationship and the correlation coefficients are summarized in the following table 6.2.

Transformations	The impact of the transformation on	
	Linearity	Correlation
Square root \sqrt{x}	*	*
Logarithm $\log x$	—	—
Negative reciprocal $-1/x$	—	—

* Improvement

— No improvement

Table 6.2

The impact of different transformations on linearity and correlation coefficients

From the results in table 6.2 the square root transformation is considered the most suitable transformation to be adopted as it improves both the linearity of the relationship and the correlation coefficients. Whereas, neither the log transformation nor the negative reciprocal improves any of them. Therefore, it was decided that the square root was the best transformation to be applied before undertaking any further analysis except for total employment costs which will be used in its original form.

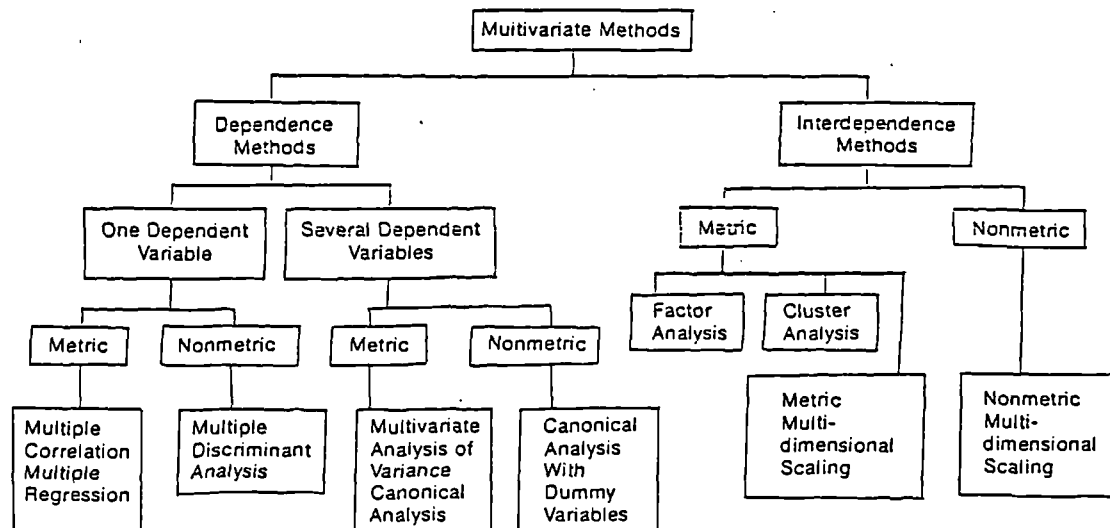
Finally it should be noted that although the preliminary statistical procedures aid our understanding of the main features of the data and suggested the suitable kind of transformation; to gain more knowledge about the relationship between the underlying variables and audit fees other advanced statistical techniques should be applied, such as multivariate analysis techniques which are discussed in the following section 6.2.

6.2 CHOICE OF THE STATISTICAL TECHNIQUE AND STATISTICAL PACKAGE:

Introduction:

Some multivariate analysis techniques were considered in analysing the data of the present study. Multivariate analysis is the branch of statistics concerned with analysing multiple measurements (Cooley 1971)¹⁴, or analysing more than two variables which are interrelated in such ways that their different effects can not easily be studied separately, (Hair 1984)³².

There are several techniques included in multivariate analysis, Hair 1984³² specified and classified most of these techniques as shown in the following figure.



Source: Adapted from J. Sheth, "The Multivariate Revolution in Marketing Research," Journal of Marketing (January, 1971).

Figure 1.1—A Classification of Multivariate Methods

Figure 6.6

Classification of multivariate methods

The classification is categorized by two major methods, the dependence methods where a variable (or a set of variables) is identified as the dependent variable to be explained by other independent variables, and the interdependence methods where the variables are not able to be classified either dependent or independent variables, instead all the variables are analysed simultaneously to give meaning to the entire set of variables.

Figure 6.6 also revealed that selecting the appropriate technique to be utilized depended on two main criteria, the number of the dependent variables and the type of measurement scale employed by the variables such as metric (quantitative / numerical) or nonmetric (qualitative / categorical).

The following are the two techniques used in the statistical analysis of the data in this study:

1. Multiple regression analysis:

According to the previous criteria multiple regression analysis is the appropriate technique to be applied in analyzing the data of this study as it involves one dependent metric variable and several metric independent variables. However, the previous criteria could be a general rule for selecting the regression technique as there are other regression assumptions which should be satisfied in order to utilize such a technique successfully.

For example, the regression model independent variables are assumed to have the lowest possible correlation with each other, and they are also

assumed to have linear relationship with the dependent variable (linearity assumption). Other assumptions regarding the regression model residual should also be satisfied in order to ensure the appropriateness of the model such as normality, constant variance, and independence of the residual Please 1987⁷², Norusis 1985⁷⁰. Detailed analysis of this technique and its assumptions are discussed in section 6.5.

2.PRINCIPAL COMPONENT ANALYSIS:

Because of the interrelation between the independent variables i.e., multicollinearity problem (which is discussed in the next section 6.3), principal component analysis, as one of the most commonly used solutions to the multicollinearity problem, was firstly applied, then multiple regression analysis was performed using the factor scores derived from the application of the principal component analysis. Detailed analysis of this technique is discussed in section 6.4.

The statistical package:

The computer statistical package for the social sciences SPSS-X was used to perform both the principal component and the multiple regression analysis.

6.3 PROBLEM IN THE ANALYSIS (MULTICOLLINEARITY):

The size variables in this study are highly correlated with each other (multicollinearity problem). The correlation matrix of the independent variables in table 6.3 provides an indication of the interrelation among the independent variables.

Variables *	Y	X1	X2	X3	X4	X5	X6	X7
Y Audit fees	1.000							
X1 Creditors	.891	1.000						
X2 Debtors	.923	.975	1.000					
X3 Sales	.912	.968	.970	1.000				
X4 Stocks	.881	.938	.940	.913	1.000			
X5 Empl. costs	.916	.907	.925	.892	.901	1.000		
X6 No. of sub.	.517	.283	.321	.332	.330	.372	1.000	
X7 No. of count.	.450	.283	.367	.309	.364	.429	.683	1.000

*Using square root: as pointed out previously, the analysis in this study is performed on the variables in their square root form except employment costs which is used in its original form.

Table 6.3

The correlation matrix

From inspection of the correlation matrix in table 6.3 it is obvious that the first five variables (the size factors) are highly correlated with each other, e.g. the correlation between (X1, X2) =.975, (X1, X3) =.968, (X1, X4) =.938, (X2, X3) =.970, (X2, X4) =.940. Such correlations are often higher than the simple correlation coefficient between each independent variable and the dependent variable, and also

higher than the overall R^2 value 90%*.

Some degree of multicollinearity was expected to exist as "it always appears in most economic relationships, and it is quite frequent in cross section data of manufacturing companies, where labour and capital inputs are almost always highly intercorrelated because large companies tend to have large quantities of both of them", Koutsoyannis 1978⁵⁴.

When multicollinearity exists the estimated regression coefficients for the independent variables may vary substantially, depending on which other independent variables are included in the model. Thus, the value obtained of b in any particular fitted model does not indicate the effect of x on y in any absolute sense. Consequently, a failure of the significance tests may also happen, (Cramer 1972¹⁷, Geary and Leser 1968³⁰). In addition, the estimated regression coefficient tends to have extremely large sampling errors indicating that they vary widely in repeated samples," Neter 1982⁶⁸.

It could be concluded that in the presence of multicollinearity the separate effects of the independent variables on the dependent variable can not be measured satisfactorily (Maddala 1977⁶¹), and the parameter estimates are unstable. As a result "this multicollinearity is certain to cause trouble if we attempt to estimate the regressions with straight forward least squares, Pidot 1969⁷¹. Thus, in order to avoid the complications of multicollinearity and to take into account the influence of all the variables the principal component technique will be applied.

* R^2 : is the square root of multiple R [the correlation coefficient between a set of independent variables X 's and the dependent variable Y]. It measures the degree of the association between the dependent and independent variables.

Therefore, the statistical analysis in this study was conducted in two stages as shown in the following figure 6.7 firstly: the principal component analysis as presented in section 6.4, Secondly: the multiple regression analysis as presented in section 6.5.

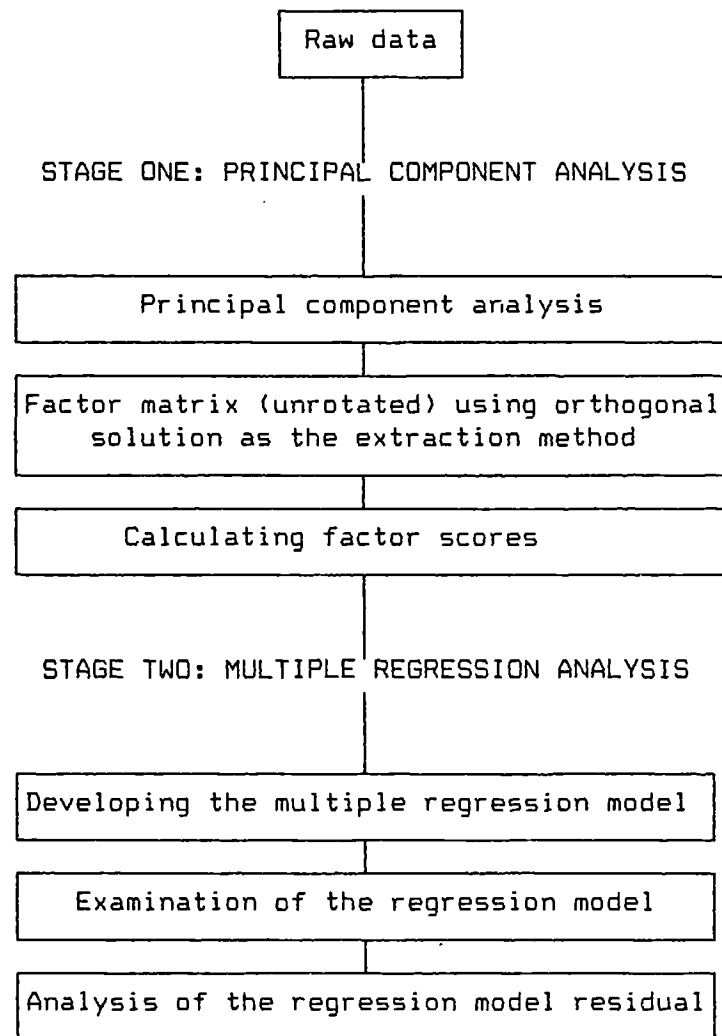


Figure 6.7

The statistical analysis flow diagram

6.4 RESULTS AND DISCUSSION OF THE PRINCIPAL COMPONENT ANALYSIS:

Introduction:

Principal component analysis as one of the factor analysis techniques, was used in this study to analyse the interrelation among the independent variables, and explain these variables in terms of their common underlying dimensions.

In addition, applying the principal component using the orthogonal solution as the extraction method helped to solve the problem of multicollinearity by creating a new set of orthogonal or uncorrelated factors, which replaces the original set of variables, represents linear combination of them, and explains the maximum amount of the variance from the original ones. However, in order to utilize this new set of factors successfully in any subsequent analysis, they should achieve a "meaningful reduction i.e., they should have any specific economic meaning", Koutsoyiannis 1978⁵⁶. In this study satisfactory results were obtained as will be seen in the analysis.

The following considerations were taken into account when applying the principal component technique:

— The sample size in this study (65 observations) is nine times more than the number of variables (7) used in the analysis. Therefore, it has the desirable statistical properties to factor analyze a set of variables, which is "as a general rule that the sample should be four or five times as many observations as there are variables to be analyzed", Hair 1984³².

— All the analysis variables are of metric measurement which are also assumed to be for the application of this technique.

— The variables are standardized in each case (by subtracting the mean of the factor and dividing by the standard deviation).

The factor matrix:

Through the application of principal component technique the correlation matrix was transformed to obtain the initial unrotated factor matrix, which provides the number of factors extracted and the loadings of all variables on each factor (or the correlation between the original variables and their respective factor), as shown in table 6.4. The unrotated factor matrix was chosen because the results obtained confirmed the hypothesised structure regarding the classification of the analysis variables (i.e., size and complexity). Therefore, it has a meaningful interpretation. In addition, successful results were obtained by applying the multiple regression analysis as will be seen in the next section 6.5.

The variables	Factor1 Size	Factor2 Complexity
Creditors	.960	-.230
Debtors	.976	-.161
Sales	.959	-.183
Stocks	.954	-.142
Employment costs	.952	-.064
No. of subsidiaries	.469	.787
No. of countries	.492	.776
Eigenvalue	5.07	1.36
Percentage of variance	72.5	19.4
Cumulative percentage of variance	72.5	91.9

Table 6.4

The factor matrix loadings & the
initial statistics

Table 6.4 displays the initial statistics in terms of the eigenvalue of each principal component (i.e., the amount of variance accounted for by each factor). The table also shows the percentage of the total variance attributable to each factor, and the cumulative percentage of variance (91.9), which indicates the percentage of variance attributable to that factor and the factor that precedes it in the table (i.e., $72.5 + 19.4$).

Investigation of the previous table revealed that the principal component technique extracted two factors (components) in the order of their importance, where the first five variables loaded significantly on factor one, and the last two variables loaded significantly on factor two. These two factors can be interpreted as follows:

Factor one:

Which was named as the size factor where the five variables representing the company size (creditors, debtors, sales, stocks, and employment costs) loaded significantly on this factor. Generally, the size factor attains the higher eigenvalue 5.07 and accounts for the larger amount of variance 72.5. Debtors explained the majority of variance in factor one (.976).

Factor two:

Was named as the complexity factor, where the two complexity variables (number of subsidiaries, and number of countries) were loaded significantly on this factor. Factor two has an eigenvalue 1.36, and accounts for 19.4 of the variance. Therefore, the cumulative percentage of variance accounted for by the two factors is 91.9%. Number of subsidiaries explained the majority of variance in factor two (.787).

The above results are compatible with those from Taylor and Baker

1981⁸⁶, who found that principal component could differentiate between the size and complexity variables.

Generally, there is no absolute cutting point for the total variance or number of factors to be extracted. According to the percentage of variance criterion, the 91.3 percentage of variance extracted by the two factors was considered reasonable or satisfactory as "in the social sciences where the information is less precise, it is not uncommon for the analyst to consider a solution which accounts for 60% of the total variance (and in some instances even less) as a satisfactory solution. In addition, according to the latent criterion, only the factors having latent roots (eigenvalue) greater than one are considered significant", (Norusis 1985⁷⁰, Hair 1984³²).

Calculating the factor scores:

In order to conduct the subsequent regression analysis, the composite factor scores should be calculated. "factor scores are composite measures for each factor representing each subject. The original raw data measurements and the factor analytic results are utilized to compute the factor scores using a computer programme (s)", Hair 1984³². The obtained factor scores will represent the raw data or the independent variables in the multiple regression analysis.

Conclusion:

In summary, the principal component technique has created two uncorrelated factors which replace the original variables, the use of which will solve the problem of multicollinearity, (i.e., the interaction between the independent variables). In addition, successful or meaningful results were obtained, as the principal component technique could differentiate between the size and complexity variables. Such result was compatible with the hypothesised questionnaire structure. Finally, principal component produced the factor scores for subsequent use in the multiple regression analysis.

6.5 RESULTS AND DISCUSSION OF THE MULTIPLE REGRESSION ANALYSIS:

Introduction:

This section presents the results of the regression analysis and discusses these results in the context of the major assumptions and tests stated in the multiple regression technique.

In this statistical analysis a hypothesis that the audit fee AR is affected by both the size and complexity of the company has been examined through the application of the multiple regression. Such a technique can specify which variables are the most important in affecting audit fee determination. It can also help to predict the expected values of y (the dependent variable) or the changes in y in response to changes in values in the X 's (the independent variables). In addition, multiple regression technique can determine whether a certain relationship even exists or not by confirming or rejecting that such relationship may have happened by mere chance.

The linearity assumption:

The classical linear regression model assumes that the dependent or response variable is a linear function of the independent or regressor variables, Hawkins³⁴. However, some curvilinear relationships can be converted into linear by applying different kinds of transformations, then the ordinary least square regression OLS can be performed on transformed data. The reason to linearize the relationship is that linear models are much easier to solve than non-linear, William 1987³⁵.

The previous results of the preliminary statistical procedures revealed that the assumption of linearity can be satisfied by applying the square root transformation. However, the analysis was performed using both transformed and untransformed data, to see the impact of the transformation on the regression results.

Developing the regression model:

To develop the audit fee regression model multiple regression analysis was applied using the two factors (components) derived from the application of the principal component technique as the independent variables, and audit fees as the dependent variable. The explanatory audit fee model was developed to give a better identification of the relationship between audit fees and the company size as measured by factor one, and its complexity as measured by factor two.

The analysis was performed (on 65 cases) and the following is the obtained audit fee model using the stepwise regression procedure (forward selection and backward elimination procedures were also used, and the results were exactly the same - see appendix 5 for more details).

$$\begin{aligned}
 y &= b_0 + b_1 x_1 + b_2 x_2 + e \\
 AR &= b_0 + b_1 (\text{Factor1}) + b_2 (\text{Factor2}) + e \\
 AR &= 1198.0 + 992.2 (\text{Size}) + 417.8 (\text{Complexity}) + e
 \end{aligned}$$

Where:

y = the dependent variable audit fees AR.

x_1 = Factor1 = Principal component one (Size).

x_2 = Factor2 = Principal component two (Complexity).

b_0 = the y intercept. It has a positive sign, which indicates that there is a fixed audit cost before both size and complexity are considered.

b_1 992.2 & b_2 417.8 = the regression coefficients, or the slope of the regression line. The regression coefficients b_1 & b_2 describe how changes in X_1 and X_2 affect the value of Y , (or namely the change in Y which accompanies a change of one unit in X). The positive signs of the regression coefficients in the above model indicate that the audit fee is positively related to both size and complexity of the company i.e., as the company size and its complexity increase audit fees increase. Unfortunately, it is difficult to give meaningful economic interpretation to the regression coefficients of the two factors size and complexity in the above model as these factors represent a combination of variables.

e = the error term, which accounts for the unexplained variance. Without the inclusion of the error term the left and right hand sides of the equation would not be equal; that could be due to " measurement error, as with anything else the X 's and y 's may be subject to this. Or there may be other explanatory variables that have not been brought into the regression equation", (Barnes 1981⁴, Mayes 1976^{4a}). The error term is assumed to be a normally distributed, independent, random variable with a mean of zero and constant variance.

The correlation matrix in table 6.5 indicates that factor one (size) has a higher correlation with audit fees .87 than factor two .37, which means that the company size is more closely associated with audit fees than the complexity of the company.

Independent variables	Correlation coefficient
Factor 1 (size)	.87
Factor 2 (complexity)	.37

Table 6.5

The correlation coefficient between audit fees and the size and complexity of the company

Examination of the regression model

The adequacy of the regression model was judged by the most commonly used statistical measures and tests. Such measures and tests indicate the statistical significance and the appropriateness of the model, and tests for the violation of the regression model assumptions. More detailed technicalities about these measures and tests are included in appendices 6 & 7.

Some important statistical measures:

Two main measures were used to examine the statistical significance of the model i.e., the adjusted R square value and the standard error of the estimate.

— The adjusted R square value: Which indicates the amount of variation that the model explains. It is a reliable measure of goodness of fit of the model in the population. The higher the value of the adjusted R square the greater the explanatory power of the regression model. The obtained audit fee regression model explains 90% of the variation in audit fees.

— The standard error of the estimate: Which is a useful measure of the dispersion around the multiple regression plane. The smaller the value of the standard error the better the fit of the model. The value of the standard error of the audit fee model is 365.5 .

Summary of the regression results of both transformed and untransformed models is presented in the following table 6.6.

Statistical measures	Transformed model	Untransformed model
Adjusted R square	.90	.84
Standard error of the estimate	365.0	452.7

Table 6.6

Summary statistics of both transformed and untransformed models

The results of the previous measures shown in table 6.6 reveal that the transformed model gives a better fit than the untransformed model in terms of its higher value of the adjusted R square and its lower value of the standard error of the estimate. The transformed model explains 90% of the variation in audit fees, which means that both size and complexity of the company are major considerations in fee determination. The unexplained variance 10% means that the audit fee is affected by other factors not included in the equation i.e., auditors depend on other factors in addition to the size and complexity of the company when pricing for their audit.

Some important statistical tests:

The statistical significance of the regression model was also examined by the two most commonly used statistical tests i.e., the F test, and the

t test.

1. The F test: or the overall test for goodness of fit of the regression model, which tests the statistical significance of R square. In other words, it tests the hypothesis that the amount of the variation explained by the regression model is not a chance occurrence. The two hypothesis can be given as follows:

— The null hypothesis: which is usually denoted by $H_0 : R^2 = 0$. It means that the X's do not explain some variation in y. Therefore, the regression equation as a whole is not significant or the value of R^2 occurred by chance.

— The alternative hypothesis: which is usually denoted by $H_1 : R^2 \neq 0$. It means that the X's explain the variation in y. Therefore, the regression equation as a whole is significant or the value of R^2 is not a chance occurrence.

The test of the population $R^2 = 0$ can be obtained from the analysis of variance, which is shown in table 6.7.

Analysis of variance			
(Transformed model)			
	DF	Sum of Squares	Mean Square
Regression	2	7417610.35794	37088355.17897
Residual	62	8262128.62668	133260.13914
		F=278.31545	SIGNIF F=.0000

(Untransformed model)			
	DF	Sum of Squares	Mean Square
Regression	2	69732581.44708	34866290.72354
Residual	62	12706257.53754	204939.63770
		F=170.12956	SGNIF F=.0000

Table 6.7

Analysis of variance of both transformed and untransformed models

In the analysis of variance the variability of the dependent variable (total sum of the squares) is divided into two components, the explained variance or sum of squared explained by regression [SSreg], and the unexplained variance or sum of squared residual [SSres]. (See appendix 6 for more details).

The significance of the regression model as a whole is evaluated by the F test, which can be performed by calculating the computed F statistic as given by the following ratio:

$$F = \frac{\text{Mean square regression}}{\text{Mean square residual}}$$

The computed F statistics of both the transformed and untransformed models exceeds the critical F value 3.15 for two and sixty two degrees of freedom at the 5% level of significance. Therefore, the null hypothesis H_0 was rejected i.e., the explained variation did not happen by chance. Generally, the F value in the previous table shows that the transformed model has better fit than the untransformed model.

2.The t test: or the test of the regression coefficients, which tests the significance of each independent variable. It tests the hypothesis that the population $B = 0$. In this case the two hypothesis are:

- The null hypothesis $H_0: B = 0$ which means that the X is not a significant explanatory variable or y does not depend on X.
- The alternative hypothesis $H_1: B \neq 0$ which means that the X is a significant explanatory variable.

The regression coefficients and the t values of each independent variable (size & complexity) of both transformed and untransformed models are shown in table 6.8.

Independent variables	Transformed model		Untransformed model	
	Reg. coeff.	t value	Reg. coeff.	t value
Size	992.194	21.744 *	923.719	16.324 *
Complexity	417.806	9.156 *	486.122	8.591 *

* Significant at 5% level

Table 6.8

The regression coefficients and the t values of both transformed and untransformed models

As expected, the results obtained in table 6.8 show positive signs of all the regression coefficients, which means that the company size and its complexity are expected to result in a higher audit fee as their values increase. The results also indicated that the regression coefficients of both models are statistically significant at the 5% level of significance, as their computed t values exceeds the critical t value (from the student's t distribution table) at this level. However, the transformed model has better results, as the t values for its independent variables are higher than in the untransformed model.

In addition to the hypothesis testing, the confidence limits were constructed at a 5% level of significance (the standard error of each of b_1 and b_2 is 45.6). Such confidence limits are interval estimates of the b_1 and b_2 . The obtained confidence limits of the transformed model's regression coefficients were:

1. For company size b_1 (992.2)

— The lower confidence interval (lci) = 901.0 , or

$$b_1 - t(S_{b_1}) = 992.2 - (2.00 * 45.6)$$

— The upper confidence interval (uci) = 1083.3 , or

$$b_1 + t(S_{b_1}) = 992.2 + (2.00 * 45.6)$$

2. For complexity of the company b_2 (417.8)

— The lower confidence interval (lci) = 326.6 , or

$$b_2 - t(S_{b_2}) = 417.8 - (2.00 * 45.6)$$

— The upper confidence interval (uci) = 509.0 , or

$$b_2 + t(S_{b_2}) = 417.8 + (2.00 * 45.6)$$

The calculated lower and upper confidence intervals indicated that the slope of the regression of both size of company b_1 , and its complexity b_2 are inside the acceptance region.

The relative importance of each independent variable:

The relative importance of the company size and its complexity was evaluated by their regression results in terms of the addition to the adjusted R square value and the reduction in the value of the standard error of the estimate S_e , through the application of the stepwise regression procedure. Table 6.9 displays the results of the two regression steps, and the changes in these results after the second regression step.

Variables selected at each step	Adj.R ²	Addition in adj.R ²	S _e	Reduction in S _e
Step(1):Size	.76	—	555.4	—
Step(2):Complexity	.90	.14	365.0	190.4

Table 6.9

The results of the two regression steps regarding the values of adjusted R² & standard error of the estimate

The results in table 6.9 indicate that the company size was selected in the first regression step. It explains 76% of the variation in audit fees, and the value of the standard error of the estimate was 555.4 . When complexity was entered into the regression model in the second step, it increased the adjusted R² value by 14% and reduced the standard error of the estimate by 190.4 . In summary, it could be concluded that statistically company size is more important than its complexity in explaining the variation in audit fees.

Analysis of the regression model residual:

The appropriateness of the regression model was determined through the analysis of the regression model residual. A residual is the difference between an observed value and the value predicted by the sample data.

The normality assumption was tested through the direct examination of the residual. Figures 6.8 and 6.9 show the plot of the cumulative standardized residual against the expected normal probability distribution for both the transformed and untransformed models respectively.

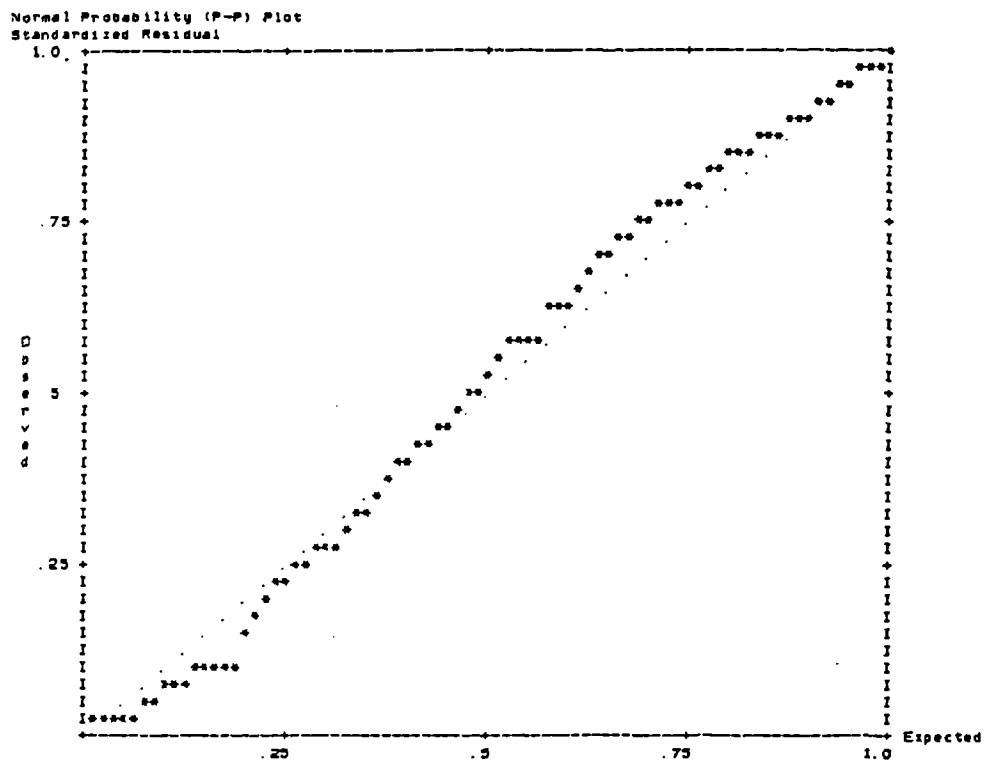


Figure 6.8

A plot of the cumulative standardized residual against normal probability distribution (Transformed model)

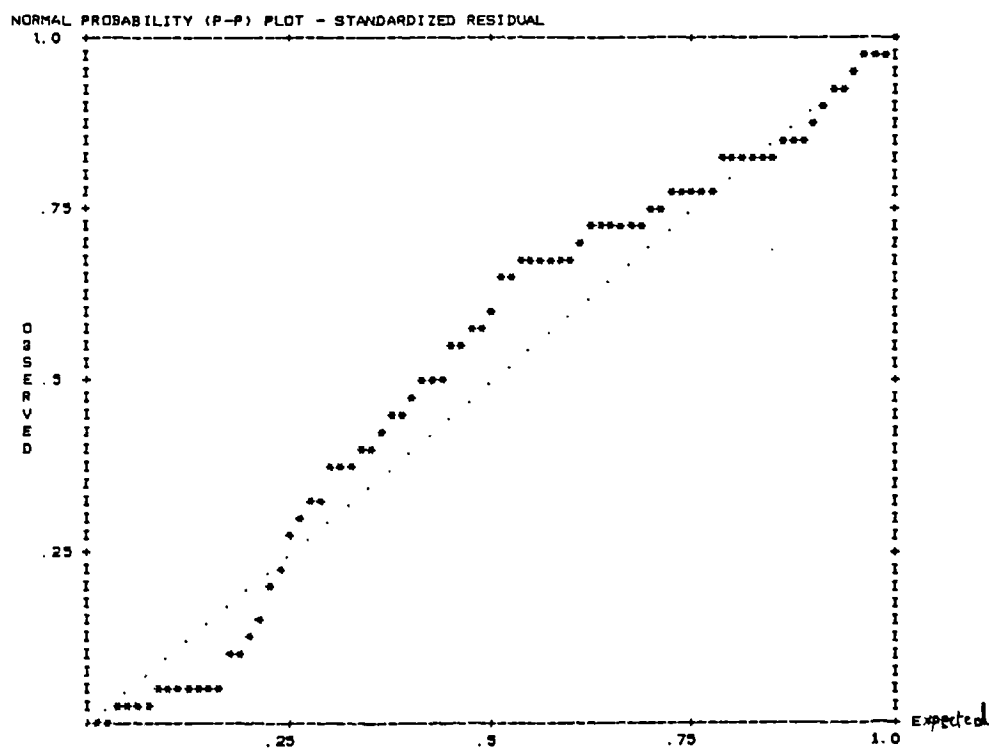


Figure 6.9

A plot of the cumulative standardized residual against normal probability distribution (untransformed model)

The residual of the transformed model in figure 6.8 has lower proportion of variance than in the untransformed model, and it appears to be reasonably normally distributed. Whereas, the residual of the untransformed model in figure 6.9 appears to have extensive deviation from the normal distribution line. Therefore, the assumption of normality can be satisfied under the transformed model.

The residual was also plotted against the predicted values of both transformed and untransformed models in figures 6.10 & 6.11.

Inspection of the plots in these figures revealed that the transformed model attains better fit to the assumption of constant variance, as the spread of the residual relatively is not increasing or decreasing with predicted values. In addition, its residual is also more randomly distributed in a band about the horizontal line through zero than in the untransformed model. Therefore, it could be concluded that there is no relationship between the predicted and residual values under the transformed model.

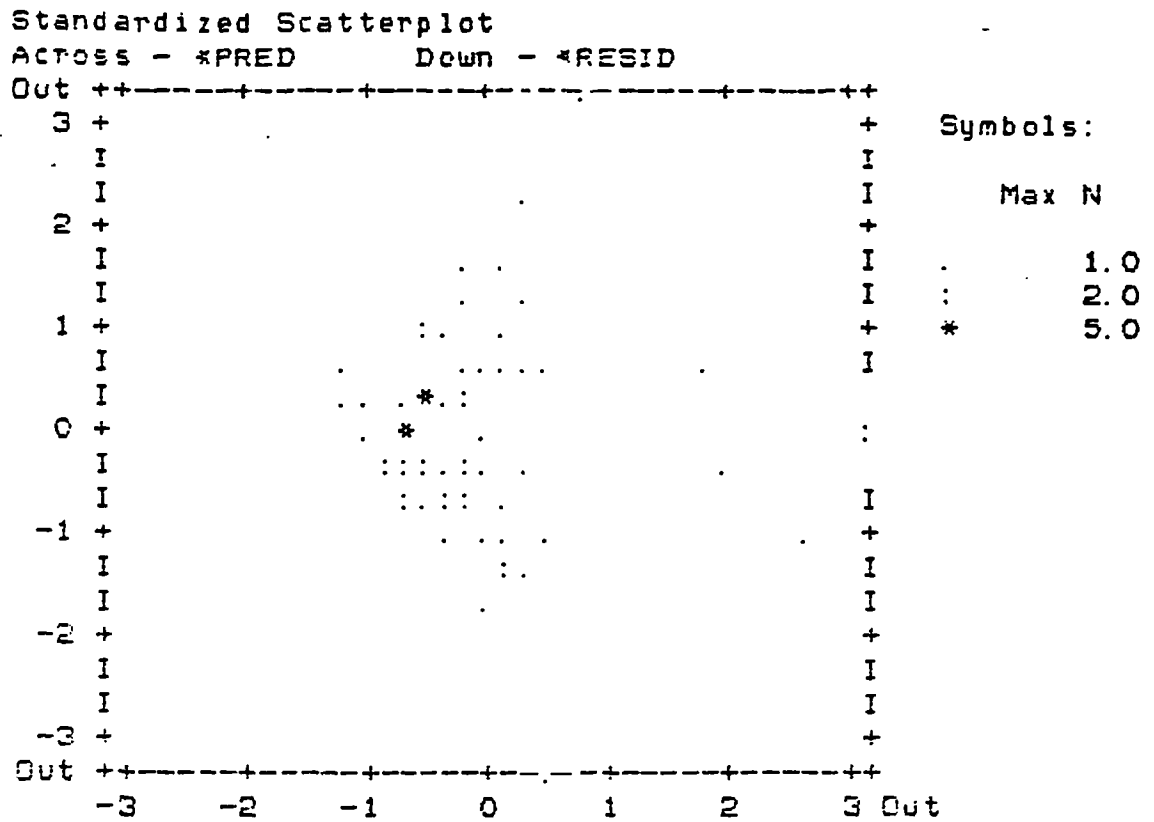


Figure 6.10

A plot of the standardized residual against the
predicted values (transformed model)

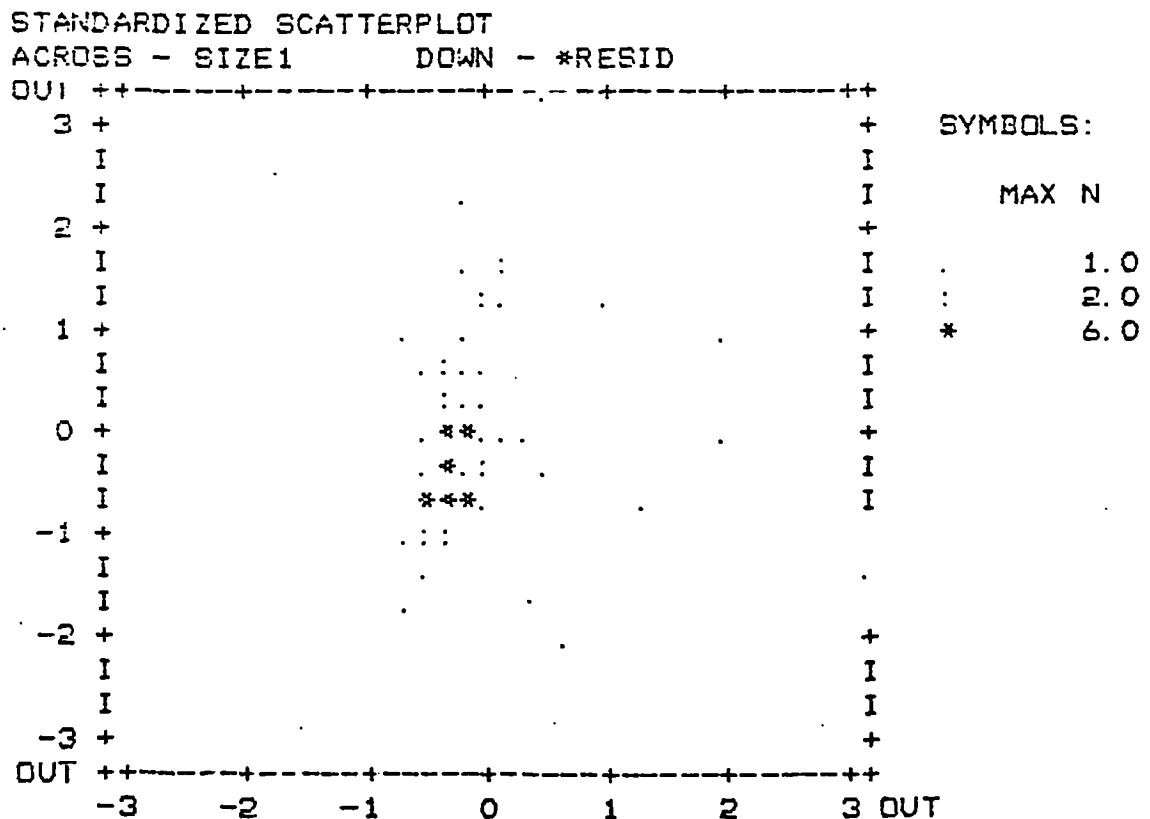


Figure 6.11

A plot of the standardized residual against the
Predicted values (untransformed model)

Prediction with the model:

It must be noted that the model developed in this analysis is derived from data of the top 65 manufacturing companies. Therefore, it is not recommended to be used or if so with extreme caution for prediction purposes with small or medium companies. To use such a model for prediction purposes the main steps are:

(1): The new data (which consists of CR, DE, SA, ST, EMC, SUB, and CO) should be transformed using the squareroot transformation (except EMC).

(2): The transformed and untransformed factors should be standardised by subtracting the mean of the factor and dividing by the standard deviation. The following are the mean and standard deviation of these factors which should be used for each factor:

	Mean	Standard deviation
CR	515.162	346.048
DE	500.679	316.831
SA	1230.405	836.218
ST	499.844	346.583
EMC	373712.000	505345.710
SUB	6.552	2.763
CO	3.376	1.301

Then we have for example the first 'new' explanatory variable is :

$$\frac{\sqrt{X} - \sqrt{\bar{X}}}{\text{Standard deviation}}$$

(3): Calculate factor 1:

'New'CR	x	.960	+	=
— DE	x	.976	+	= +
— SA	x	.959	+	= +
— ST	x	.954	+	= +
— EMC	x	.952	+	= +
— SUB	x	.469	+	= +
— CO	x	.492	+	= +

Factor 1 (....)

(4): Calculate factor 2:

'New'CR	x	-.230	+	=
— DE	x	-.161	+	= +
— SA	x	-.183	+	= +
— ST	x	-.142	+	= +
— EMC	x	-.064	+	= +
— SUB	x	.787	+	= +
— CO	x	.776	+	= +

Factor 2 (....)

(5): Substitute in the following equation:

The predicted audit fees = 1198.0 + 992.2 (Factor 1) + 417.8 (Factor 2)

The following is an example to show how this model can be applied.

Suppose we have a company which has the following characteristics:

CR £687400, DE £453500, SA £4382000, ST £402200, EMC £590200 (in 000),
SUB 31 & CO 3.

The new transformed and standardized explanatory variables are:

$$CR = \sqrt{687400} - 515.162 / 346.048 = 0.91$$

$$DE = \sqrt{453500} - 500.679 / 316.831 = 0.55$$

$$SA = \sqrt{4382000} - 1230.405 / 836.218 = 1.03$$

$$ST = \sqrt{402200} - 499.844 / 346.583 = 0.38$$

$$EMC = 590200 - 373712.0 / 505345.710 = 0.43$$

$$SUB = \sqrt{20} - 6.552 / 2.763 = -0.75$$

$$CD = \sqrt{3} - 3.376 / 1.301 = -1.26$$

Calculating the two factors:

Factor 1:

$$\begin{aligned} 0.91 & * .960 = 0.87 \\ 0.55 & * .976 = 0.54 + \\ 1.03 & * .959 = 0.99 + \\ 0.38 & * .954 = 0.36 + \\ 0.43 & * .952 = 0.41 + \\ -0.76 & * .469 = -0.36 + \\ -1.28 & * .492 = -0.63 + \end{aligned}$$

$$2.18$$

Factor 2

$$\begin{aligned} 0.91 & * -.230 = -0.21 \\ 0.55 & * -.161 = -0.09 + \\ 1.03 & * -.183 = -0.19 + \\ 0.38 & * -.142 = -0.05 + \\ 0.43 & * -.064 = -0.03 + \\ -0.76 & * .787 = -0.60 + \\ -1.28 & * .776 = -0.99 + \end{aligned}$$

$$-2.14$$

By substituting in the regression equation:

The predicted audit fees = $1198.0 + 992.2 (2.18) + 417.8 (-2.1) = \text{£ } 2.5\text{m}$

Conclusion:

Besides attaining higher explanatory power in terms of higher value of adjusted R square, lower value of the standard error of the estimate, and higher t values for the independent variables, the transformed model has satisfied the main assumptions regarding the residual (i.e., normality, constant variance, and independence). In summary, one can conclude that based on the proportion of variance accounted for and examination of the residual the transformed audit fee model is considered appropriate and statistically significant.

6.6 FURTHER ANALYSIS:

Introduction:

In the previous statistical analysis in chapter six all the independent variables were taken into account through the application of the principal component technique (which was used as a solution to the multicollinearity problem) followed by the multiple regression technique.

The results of principal component analysis revealed that the two orthogonal factors were of major importance accounting for 91% of the variation in all the original variables. They also indicated that debtors explain the majority of variance in the first principal component which has been named as the size factor, and number of subsidiaries explain the majority of variance in the second principal component which has been named as the complexity factor. Thus, debtors and number of subsidiaries are very important variables in explaining the pattern of variables in the explanatory variables. However, this of course does not mean to say that they are necessarily important in explaining the variation in audit fees. The analysis had to proceed therefore to examine the relationship between audit fees and the explanatory variables.

The results of the subsequent regression analysis indicated that the two factors size and complexity were significant determinants of audit fees as they explained 90% of its variation, and the derived audit fee model was appropriate and statistically significant. However, such a model was not able to identify the most significant individual size and

complexity variables; rather it identified size in terms of creditors, debtors, sales, stocks, and employment costs as a group, and complexity in terms of number of subsidiaries, and number of countries as a group. This model was not a simple one for prediction purposes as tedious computational effort was required to apply it.

The main purposes of the following analysis are:

1. To identify the most significant size and complexity variables.
2. To design a simple audit fee model which could be used for prediction purposes.

1. The significant size and complexity variables:

Because of the existence of the multicollinearity problem (as discussed in section 6.3) which prevents the measuring of the separate effects of each independent variable on the dependent variable, the approach which is best adopted to identify the most significant size and complexity variables affecting audit fees is the dropping of the insignificant variables using regression analysis. This can be achieved by using either or both of the following approaches:

The first approach: is to apply the procedure which was suggested by Koutsoyoannis 1978⁵⁴. This procedure which was mainly used to detect for the multicollinearity problem, can also help to identify the significant and insignificant variables which should and should not be included in the regression model. This procedure involves two main steps, the first is "to regress the dependent variable on each of the independent variables' separately, then choose the elementary regression which gives the plausible results in terms of the expected regression coefficient and the R^2 value. The second step is to insert gradually

additional variables and examine their effects on the individual coefficients, on their standard errors, and on the overall R^2 . If the new variable improves R^2 without rendering the original individual coefficients unacceptable 'wrong' it is considered useful and retained as an explanatory variable in the model. Conversely, it would be rejected if it did not improve R^2 value, or it did not affect to any considerable extent the values of the individual coefficients".

According to this procedure the results obtained indicated that debtors were the most significant variable in explaining the variation in audit fees. In fact, this one variable explained 85% of the total variation in audit fees. By gradually inserting each of the other independent variables it was found that number of subsidiaries and total employment costs are the second and third most significant independent variable as shown in table 6.10.

The second approach: Alternative statistical procedures can also be used to select which variables to include in the model and which to exclude. Some procedures have been developed for systematically adding and deleting variables such as forward selection, backward elimination, and stepwise regression, (Maddala 1977⁴¹ , Norusis 1983⁷⁰).

Such methods depend on some criteria for adding and deleting each of the explanatory variables. In the forward selection procedure the first variable considered for entry into the equation is the one with the largest correlation with the dependent variable. Then the criteria for entering a second variable is the largest partial correlation which is equivalent to the variable with the largest F value i.e. the minimum value of the F statistic that a variable must achieve in order to enter into the equation.

The backward elimination procedure starts with all the variables in the equation and sequentially removes them. Instead of entry criteria, removal criteria are used i.e., the minimum F value that a variable must have in order to remain in the equation. Variables with F value less than this are eligible for removal.

The stepwise regression procedure is a combination of forward selection and backward elimination procedures. As the first variable is selected in the same manner as in forward selection. The first variable is also examined to see whether it should be removed according to the removal criteria as in backward elimination. The second variable is selected based on the highest partial correlation. The procedure is repeated until none remain that meet the removal criteria.

"None of these variable selection procedures is 'best' in any absolute sense: they merely identify subsets of variables that for the sample are the predictors of the dependent variable," (Maddala⁶¹, Norusis⁷⁰).

The regression analysis was run with all the independent variables, using the above three procedures. Although in general these procedures give different results i.e., they do not result in the same estimating equation, the results in this analysis were extremely encouraging as they have produced the same equation, and they all identified that debtors, number of subsidiaries, and total employment costs are the significant variables affecting audit fees (as shown in table 6.10). The table displays the values of the adjusted R^2 after each step, as well as the values of the standard error of estimate. Such results confirmed the results of the first approach regarding the significance of these three factors.

Variables selected at each step	Adjusted R ²	Standard error of estimate
Step 1: Debtors	.85	440.46
Step 2: Debtors & No. of subsidiaries	.90	353.02
Step 3: Debtors & No. of subsidiaries & Employment costs	.92	328.76

Table 6.10

The most significant size and complexity variables

The results in the above table indicate that debtors is the most significant factor affecting audit fees which explains 85% of its variation, followed by number of subsidiaries which increased the adjusted R² to 90%. Finally, total employment costs as the third significant factor, with which the model explains 92% of the variation in audit fees. The model was statistically significant (in terms of F value) as well as the constant and the regression coefficients (in terms of their t values).

Prediction with the model:

The results obtained from this further analysis indicate that debtors, number of subsidiaries, and total employment costs are the most significant variables affecting audit fees, and the following is the resulting audit fee model:

$$\text{Audit fees} = - 662.9 + 2.0 (\text{\$/ Debtors}) + 90.2 (\text{\$/ No. of subsidiaries}) \\ + 0.0007 (\text{Employment costs})$$

The model can be examined for its predictive ability. Rather than using the sample data from which the model was derived, a superior way to examine its predictive ability is to use the model to estimate audit fees for other companies not included in the original sample. The following is an example to show how this model can be used for prediction purposes using two companies obtained from the 1983 data (i.e., the same year the model was derived). These two cases have the following characteristics:

	Company 1	Company 2
	<hr/>	<hr/>
Debtors (000)	£ 30391	£ 41297
No. of subsidiaries	51	31
Total employment costs (000)	£ 49908	£ 37846

By substituting the data of these two companies into the above equation the predicted audit fees are as follows :

Company 1:

$$\begin{aligned} \text{Predicted audit fees} &= - 662.9 + 2.0 (\sqrt{30391}) + 90.2 (\sqrt{51}) \\ &\quad + .0007 (49908) = \text{£ } 366.4 \end{aligned}$$

Company 2:

$$\begin{aligned} \text{Predicted audit fees} &= - 662.9 + 2.0 (\sqrt{41297}) + 90.2 (\sqrt{31}) \\ &\quad + .0007 (37846) = \text{£ } 273.9 \end{aligned}$$

The corresponding predicted values of audit fees as well as the actual values (in 000) are presented in table 6.11.

	Actual audit fees	Predicted audit fees
Company 1	£ 325	£ 366.4
Company 2	£ 253	£ 273.9

Table 6.11

Comparison between the actual and predicted audit fees

The values of the predicted audit fees indicate that the model was able to predict reasonably accurately in these two cases. However, a superior test of prediction would use a large number of cases to be able to judge precisely its predictive ability.

6.7 SUMMARY OF THE STATISTICAL ANALYSIS MAJOR FINDINGS:

Based on the results of this statistical analysis as obtained from the application of the preliminary statistical procedures, principal component analysis, and multiple regression analysis, the following are the major findings which can be drawn:

—— As the company size (in terms of size of creditors, debtors, sales turnover, stocks, and total employment cost), and its complexity (in terms of number of company's principal subsidiaries and number of countries in which the company operates) increase, audit fees increases at a decreasing rate, that was shown by the scatterplot of the data, which indicated that audit fees increase in a curved fashion.

—— Generally, the size variables are more closely associated with audit fees than the complexity variables, according to the results of the correlation analysis. The variable total employment costs has higher correlation with audit fees .92 than both sales turnover (which is most often used in recent studies) and the rest of the size variables. Number of subsidiaries as a complexity variable attains higher correlation with audit fees than number of countries. The additional analysis revealed that the variables debtors, number of subsidiaries, and total employment costs are the most significant variables affecting the level of audit fees.

—— This study confirmed the results of both Elliot & Korpi 1978²⁵, and Taylor and Baker 1981²⁶ studies, that the square root transformation improves the correlation of the size factors with audit fees.

—— Principal component analysis was able to solve the problem of multicollinearity, by extracting two uncorrelated factors representing the company size and its complexity. It was found that debtors explains the majority of variance in factor one (size), and number of subsidiaries explains the majority of variance in factor two (complexity).

—— The regression model was developed to examine the differences in audit fees, using the two principal components size and complexity as the independent variables. It was found that the audit fee is positively related to the size and complexity of the company. In addition, both size and complexity have substantial effects on audit fees, as the regression model displayed high value of the adjusted R square, which indicated that 90% of the variation in audit fees is explained by both size and complexity of the company. It was also found that company size has stronger influence on audit fees than its complexity, based on both the correlation coefficient and the adjusted R square values.

—— The audit fee model which involved the two principal components size and complexity was appropriate and statistically significant. It satisfied the main regression assumptions regarding the residual such as normality, constant variance, and independence.

The further regression analysis revealed that debtors, number of subsidiaries, and total employment costs are the three significant factors explaining the variation in audit fees. The model which involved these three factors explained 92% of the variation in audit fees. It was also appropriate and statistically significant.

Finally, it can be concluded that the statistical analysis helped to identify the magnitude of the association between audit fees and the size and complexity of the company. It also identified the most significant size and complexity factors affecting audit fees.

6.8 COMPARISON BETWEEN THE RESULTS OF THE EMPIRICAL STUDY AND THE STATISTICAL ANALYSIS:

This section compares the results of the empirical study (in terms of the questionnaire survey and the personal interviews), and the statistical analysis (in terms of the preliminary statistical procedures, principal component analysis, and multiple regression analysis).

Generally, it could be said that the results of the statistical analysis confirmed the results of the empirical study regarding the following points:

1. Size and complexity of the company are important elements in the fee determination (as they explain 90% of the variation in audit fees), and audit fee is positively influenced by their increase:

— The results of the empirical study revealed that company size affects the scope and size of the audit work, especially if it involves some troublesome areas, such as stocks, debtors, creditors. In addition, the scope and size of the audit work are also influenced by the complexity of the company e.g., its number of subsidiaries, and number of countries in which the company operates.

— The statistical analysis confirmed the importance of company size, as it explains 76% of the variation in audit fees, and its complexity which explains 14% of the variation in audit fees. Unlike the results of the questionnaire survey which gave a low

ranking to employment costs, the statistical analysis highlighted this as one of the most significant factors.

2. Generally, large companies pay higher fees than smaller companies however, audit fee is relatively lower (economies of scale):

— The findings of the empirical study indicated that the audit fee does not increase pro rata to increases in company size, i.e., as the company gets bigger audit fee gets proportionally lower.

— Such conclusion was confirmed by the findings of the statistical analysis. For example, the scatterplot of the data revealed that when the size of the company increases audit fees increases in a curved down fashion, which means that audit fees increases by smaller proportion than company size.

CHAPTER SEVEN

THE STUDY SUMMARY AND FINDINGS

The main purposes of this study were to identify the factors associated with the annual audit fees, to determine the magnitude of this association, and to develop an audit fee model to assess the variation in audit fees paid by the largest 65 British manufacturing companies. To achieve these purposes the thesis was structured in six main chapters. This chapter provided the study summary and findings.

The first chapter:

The first chapter identified the main features of the external audit services, and audit fees. Firstly, the regulatory framework of the external audit function and audit fees was considered in terms of legislation and also the restrictions of the professional accounting bodies which govern it. Areas of legislations were identified, such as the authority appointing the auditor and determining his fee, the disclosure of the audit fee, and the legal requirements for entering the auditing profession. Some guidelines and restrictions of the professional accounting bodies were also identified, such as the basis of auditors' charge, preclusion of the charging of fees on a percentage or contingency basis, and restricting auditors from certain activities which may impair their independence & integrity.

External audit has been a matter of interest to both the legal authorities, and the professional accounting bodies. In particular, professional accounting bodies have given attention to a number of aspects such as the basis on which audit fees should be determined, the costs which should be covered by an audit fee, and the factors which

should be taken into account when determining the audit fee.

Secondly, the market for audit services was described in terms of the nature of the supply of and demand for audit services. The audit market in the U.K. appeared to have features of an oligopoly, where the supply of the audit industry is concentrated or dominated by a few big audit firms, who control a significant proportion of the industry output.

Thirdly, the main composition of an audit fee were specified as audit cost and profit (auditors reward). Audit cost was divided into fixed cost, which has to be paid whatever the size of the audit work, such as rent, and salaries of non audit staff, and variable cost which vary depending on the size of the audit work. The variable cost is a combination of direct cost, which is mainly the cost of time spent by the auditor and his staff in carrying out the audit work, plus other direct expences, and indirect cost , such as toll calls and travel expenses.

The second chapter:

The second chapter reviewed the previous work done concerning the external audit fees. The literature was classified according to the major aspects of these studies e.g., studies on the estimation of audit fees, the rapid rise in the level of audit fees, the identification of the factors affecting the level of audit fees, and the designing of an audit fee model.

The third chapter:

All the likely factors thought to affect the level of audit fees were identified through the previous literature. These factors were classified according to different criteria:

firstly, according to their impact on the level of audit fees: (1) factors directly affect the cost of time, and factors indirectly affect the level of audit fees. The time spent in the audit work was seen as a function of the company size, which could be measured by different items, such as size of sales, stocks, debtors, etc., the complexity of the company, which could be measured by number of the company's subsidiaries, and number of the countries in which the company operates etc., and other factors such as the quality of the company's internal control system, and the risk involved in the audit work. (2) factors indirectly affect the level of audit fee, such as the nature of the market (e.g., the competition which may reduce the fee to a very low level, and the probability of obtaining non audit work.

Secondly, according to their nature: (1) quantitative or objective factors, which could be easily measured, such as the size factors, and some of the complexity factors, such as number of subsidiaries, and number of countries. (2) the qualitative or the subjective factors, which are difficult to measure, such as the degree of the risk involved in the audit work, the quality of the company's internal control system, and the value of the service rendered.

Thirdly, according to their relation to the auditor and the auditee: (1) factors relate to the auditor and his firm, such as number of staff involved in the audit work, seniority of the persons engaged, and their skills & experience, and the facilities in the audit firm. (2) factors relate to the auditee (company), such as size of company, its complexity, date of company's year end, reputation of company, and its ability to pay. (3) general factors, such as the nature of the market, inflation, character of the community, and the obligations imposed by governmental regulations.

This chapter indicated that the audit fee is a product of large number

of objective and subjective factors which affect it directly and indirectly, and which can be related to auditors, auditees, and general factors.

The fourth chapter: dealt with the research methodology. Firstly it described the process of data collection, which indicated that three major data sources were used in this study i.e., published financial information (from companies annual reports), personal interviews, and mail questionnaire survey. Secondly, it also described the two samples involved in the study i.e., the statistical analysis sample which represents the largest sixty five British companies in the manufacturing sector ranked by turnover, and the survey sample which consists of one hundred large manufacturing companies and one hundred big audit firms. Definition and some classifications of the data by size of turnover, audit fee size, audit firm size, and kind of industry were also presented. The classification of the data indicated that the average audit fees increases as the size of the companies' turnover increases. On the other hand, audit fees as a percentage of turnover decreases as the size of the companies' turnover increases. Finally, the last section of this chapter presented the study analytical framework, which indicated that the relative importance of the factors identified through the previous literature will be determined empirically, and statistically.

The fifth chapter: analysed the responses to the personal interviews along with the responses to both companies and audit firms questionnaires. The results of the empirical study revealed that the variables turnover, creditors, debtors, stocks and work in progress, and total assets were identified as the most important size factors. It was also found that sometimes the size of these factors by itself may not be

significant; the complexity within each item increases the impact of their large size on the amount of audit work. Number of the company's principal subsidiaries, number of the countries in which the company operates, degree of computerization of accounting records, and degree of centralization of accounting control, were identified as the most important complexity factors. Some other factors were also believed to have influence on the level of audit fees, such as the quality of the company's internal control system, the degree of the audit risk involved, and the competition in the market for audit services. Finally, it was found that the relative importance of such factors varies from one case to another, depending on the circumstances and the nature of the engagement.

The sixth chapter: analysed the published data of the largest sixty five British manufacturing companies, using the seven size and complexity factors previously identified. To carry out the statistical analysis, firstly some preliminary statistical procedures were used to identify the main features of the data, i.e., scatterplot, and simple correlation analysis. The obtained results revealed that the audit fee is positively influenced by the increase of the size and complexity of the company. It was also found that the increase in audit fees is relatively lower, due to economies of scale. In addition, the results indicated that the square root transformation improved or linearized the relationship between audit fees and the size factors.

Chapter six also presented most of the multivariate data analysis techniques, which were classified into dependence and interdependence techniques. Multiple regression as one of the dependence techniques was selected as the suitable technique to be applied in the statistical analysis.

The audit fee is a product of large number of factors which will tend to be correlated with each other; this is especially so for the size factors. Therefore, the design of an audit fee model using a large number of such factors (independent variables) will come up against a major problem of multicollinearity (i.e., the interrelation between the independent variables). Multicollinearity was discussed therefore in terms of the reasons for it, and the problems which it may cause when estimating the regression using straight forward least squares. Such problems prevent the measuring of the separate effects of each independent variable on the dependent variable. Principal component technique as one of the interdependence techniques was applied in this study to overcome such problem; but other methods could also be used e.g., ridge regression*, ratio or first differences, or extraneous estimates (the last two methods are often used in time - series analysis). However, it must be noted that sometimes the use of some statistical procedures to avoid one problem in the data may violate other assumptions (e.g., homoscedasticity). Also, the use of the transformation to achieve linearity could violate other assumption e.g., normality of the data.

The application of the principal component technique solved the problem of multicollinearity, by creating two uncorrelated factors, which replaced the original interrelated variables. The results indicated that the principal component analysis differentiated between the size and complexity variables, as the five size variables loaded significantly on the first factor, whereas the two complexity variables loaded significantly on the second factor. Finally, the derived factor

For those interested in using this method, a good reference is Hoerl A. E. & Kennard R. W., Ridge Regression: Biased estimation for non - orthogonal problems, Technometrics, 1970, pp. 55 - 82.

scores were used in the subsequent regression analysis.

Multiple regression technique was applied to examine the differences in audit fees, using the two factors (size and complexity) as the independent variables, and audit fees as the dependent variable. The following was the derived audit fee model:

$$\text{Audit fees} = 1198.0 + 992.2 (\text{Size}) + 417.8 (\text{Complexity}) + e$$

The audit fee regression model indicated that both size and complexity are important determinants, as they explain 90% of the variation in audit fees. Company size has stronger influence on audit fees, as it explains 76% of this variation.

According to the proportion of variance accounted for, and the examination of the residual, the audit fee regression model was considered appropriate and statistically significant.

The results of the further regression analysis highlighted that debtors and total employment costs are the most significant size factors, and number of subsidiaries is the most significant complexity factors in affecting audit fees. The derived audit fee model which involved these three factors explained 92% in the variation in audit fees. It was also appropriate and statistically significant.

Finally, comparison between the results of the empirical study (the results of both companies' and audit firms' questionnaires along with the preliminary interviews) and the statistical analysis was made. The results indicated that the statistical analysis findings confirmed the empirical study's, that company size as measured by some areas i.e., turnover, stocks & work in progress, debtors, creditors, and total

assets and its complexity as measured by the company's number of subsidiaries, the number of countries in which the company operates are major considerations influencing the level of audit fees. It was also confirmed that the audit fee is positively influenced by the increase in both the size and complexity of the company, but that the increase in audit fees is proportionately lower.

Conversely, although the questionnaire returns gave a low ranking to total employment costs, the statistical analysis highlighted this as a very significant factor.

Conclusion the way ahead:

The progress of future research in this area would be substantially enhanced if the legal and / or professional authorities were to define more rigorously what is meant by the term "audit fee" and how this should be disclosed. At present the assumption has had to be made that audit fees for different companies are comparable i.e., we are comparing like with like. This may be valid but when one considers the range of non - audit services which audit firms can provide for clients, there is bound to be concern that there may be a grey area. This is bound to raise doubts and uncertainty about the comparability assumption.

This uncertainty, even if not eliminated, would be reduced not only if there were more a rigorous definition of what constitutes an audit fee but also if amounts paid as fees were shown separately from amounts paid as expenses. In addition, it should be a requirement that all sums additional to the audit fee paid to audit firms and their associated firms and / or companies should also be disclosed. Public confidence in the audit firm and its independence is paramount and is one of the reasons why audit fees are required to be disclosed. The audit firm is in a privileged position and therefore all payments made to it are material and should be disclosed.

Although the reasonableness of an audit fee cannot be predicted or determined with accuracy, there is nevertheless a "range of reasonableness" - even if this is purely subjective - above which one would want to ask the question "Why so much?" and below which one could wish to consider whether or not at that level sufficient work of an appropriate quality could have been done. However, the legislative

authorities should consider as a matter of policy whether audit fee information by itself is enough when it is possible for other fees e.g., for consultancy work, to be paid which may also be significant in assessing independence and reasonableness. Such a requirement would have to take into account the organisational structure of audit firms and cover not only the firm itself but also any other firm or company associated with it and / or in whose profits it participated.

A significant finding of this research was the importance of the number of subsidiaries as a factor in the determination of audit fees. It would not be appropriate to speculate on the possible reasons for this but questions do arise which could only be answered by further study. Why should there be a difference in audit fees, and is it significant between groups which are structured on the subsidiary company basis as opposed to the divisionalisation basis?. Is it the different legal structure which is significant or are there some other factors?. Is the geographical location of subsidiaries important, and are there "area" price and / or cost differentials for an audit assignment? Is it important, in terms of audit price, if the subsidiary audit engagement is carried out by the group audit firm, or one of its associates, as compared with a totally separate audit firm? To answer such questions would require more detailed disclosure on the audit fees incurred by subsidiary companies giving details of e.g., the amounts paid by individual subsidiary companies and whether paid to the group auditor or separate audit firm. This again reinforces the need, as a matter of policy, for greater disclosure of the total sums paid to auditors and their associated firms.

In considering further research arising out of this study, it would be useful to extend considerably the sample size so that it was not

restricted to only the very large manufacturing companies. A large sample would help test the generality of the model and its predictive ability over a much wider range of business. If such a sample also contained an appropriate number of companies not audited by the large international audit firms (The Big Ten) it would be possible also to test the validity of the subjective opinions expressed in the present questionnaire study about the relative cost efficiency of the large international audit firms compared to the smaller, more localised, practitioner.

A critical factor in the determination of audit fees is the subjective judgement by auditors of a large number of factors. It will never be possible to predict with hundred per cent accuracy what an audit fee will be, or to establish retrospectively what it should have been. We have seen that a critical factor in the determination of audit fees is the subjective judgement by auditors of a large number of factors. In order to better understand the characteristics of an audit fee, these subjective factors should be taken into account and further research should also be undertaken into how we might get a better understanding of these factors, their relative importance, and how they might be built into an audit fee model e.g., by quantification. This too is a fruitful area which future researchers may wish to consider.

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APPENDICES

APPENDIX (1)

THE COVERING LETTER
&
THE COMPANIES' QUESTIONNAIRE



Heriot-Watt University

31-35 Grassmarket, Edinburgh EH1 2HT
Telephone 031-225 6465/031-451 3001

**Vice-Principal
and Professor of Accountancy and Finance**
J R Small

your ref

our ref

date 26 August 1986

'THE DETERMINANTS OF AUDIT FEES'

I am undertaking research into the factors which determine the level of audit fees. I would be grateful if you could complete the attached questionnaire which is designed to help identify the key factors involved.

Completion of this questionnaire will take only a few minutes and a reply paid envelope is enclosed for your response.

Responses to this questionnaire are totally confidential, and will not be associated with an individual company or audit firm: only summarized information will be reported.

Any other comments you care to make about this work would also be most appreciated.

Please indicate by ticking the appropriate box:

1. Does the fee as stated in your annual report represent:

- Audit fee alone?..... ☐

or

- Audit fee plus other factors, such as accounting, taxation or
management consultancy services? ☐

2. Did you change your audit firm during the past 3 years?

Yes

No

☐
☐

If yes please indicate which year and the main reason for that :

1983

1984

1985

☐
☐
☐

3. In your opinion, do you think your company's audit fee when compared
with the size and complexity of the company is:

High?

reasonable

Low

☐
☐
☐

If it is high, what do you think could be done to hold it down?

-Improving the quality of the internal control system..... ☐

-Others, please specify _____

4. Is your company's annual audit fee determined by :

- Time spent by auditor and audit staff?..... ☐

or

- Time plus other factors?..... ☐

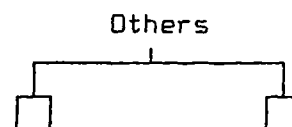
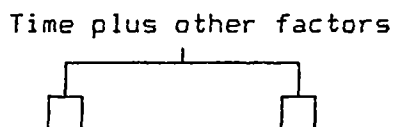
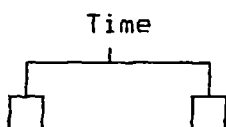
such as: _____

or

- Others?..... ☐

please specify : _____

5. Do you think that time/time plus other factors/others is a fair basis
for determining an audit fee?



6. Is your company's audit firm one of the Big 10* (see page 6)?

Yes

☐

If yes, what are the main
advantages of having your
company audited by a Big
audit firm?

No

☐

If no, do you think that the
annual audit requirements
could be satisfied by any
qualified auditor working in
a small audit firm?

Yes

No

☐
☐

If yes, what are the reasons
for that? _____

7. How important are the following factors (size, complexity and others) in affecting the amount of audit work and consequently the level of audit fee?

7.A SIZE FACTORS:

	very imp.	imp.	unimp.
A.1 - Turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.2 - Trading profit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.3 - Profit before tax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.4 - Stocks & work in progress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.5 - Debtors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.6 - Total assets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.7 - Current liabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.8 - Creditors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.9 - Loan capital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.10 - Share capital & reserves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.11 - Number of employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.12 - Employment costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.13 - Others (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please list the 4 most important "size factors" (1 being the most important and 2 the second important and so on).

(1) Factor No. _____ (3) Factor No. _____
 (2) Factor No. _____ (4) Factor No. _____

In your opinion, how does the company size affect the audit fee?

Large company

- Higher fee ()
 - Lower fee ()
 - No effect ()

Small company

- Higher fee ()
 - Lower fee ()
 - No effect ()

7.B COMPLEXITY FACTORS:

	very imp.	imp.	unimp.
B.1 - No. of principal subsidiaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.2 - No. of countries in which the company operates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.3 - No. of product lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.4 - Location of plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.5 - Nature of company's business (financial, industrial, etc.).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.6 - Type of industry (chemical, electrical, etc.).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.7 - Degree of centralization of financial control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.8 - Degree of computerization of accounting records	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.9 - Others, (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please list the 4 most important "complexity factors" (1 being
the most important and 2 the second important and so on).

(1) Factor No. _____

(3) Factor No. _____

(2) Factor No. _____

(4) Factor No. _____

7.C OTHER FACTORS:

	very imp.	imp.	unimp.
C.1 The high quality of internal control system.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()			
- Lower fee ()			
- No effect ()			
C.2 The competition in the market for audit services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()			
- Lower fee ()			
- No effect ()			
C.3 The need for non-audit work such as accounting, taxation, or management consultancy services.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()			
- Lower fee ()			
- No effect ()			
C.4 The date of company's year end	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>"Busy period"</u> <u>January - June</u>			
- Higher fee ()			
- Lower fee ()			
- No effect ()			
<u>"Less busy period"</u> <u>July - December</u>			
- Higher fee ()			
- Lower fee ()			
- No effect ()			
C.5 The continuity of audit firm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>"Continuing audit firm"</u>			
- Higher fee ()			
- Lower fee ()			
- No effect ()			
<u>"Changing audit firm"</u>			
- Higher fee ()			
- Lower fee ()			
- No effect ()			
C.6 The good reputation of audit firm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()			
- Lower fee ()			
- No effect ()			
C.7 The risk which the auditor accepts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()			
- Lower fee ()			
- No effect ()			

C.8 The good reputation of company ☐ ☐ ☐

- Higher fee ()
- Lower fee ()
- No effect ()

C.9 Others, (please specify) ☐ ☐ ☐

Please list the 4 most important "other factors (1 being the most important and 2 the second important and so on).

(1) Factor No. _____

(3) Factor No. _____

(2) Factor No. _____

(4) Factor No. _____

The Big 10:

1. Arthur Andersen

6. Grant Thornton

2. Arthur Young

7. KMG Thomson McIntock

3. Coopers & Lybrand

8. Peat Marwick, Mitchell & Co.

4. Deloitte Haskins & Sells

9. Price Waterhouse

5. Ernst & whinney

10. Touche Ross

Thank you for your assistance. If you would like information about the results of this research, please indicate the name and address to whom the results should be sent:

Department of Accountancy and Finance
 Heriot-Watt University
 31-35 The Grassmarket
 EDINBURGH
 EH1 2HT

APPENDIX (2)

THE AUDIT FIRMS' QUESTIONNAIRE

"THE DETERMINANTS OF AUDIT FEES"

Please indicate by ticking the appropriate box:

1. Is the annual audit fee determined by :

- Time spent by auditor and audit staff?..... ☐

or

- Time plus other factors?..... ☐

such as: _____

or

- Others..... ☐

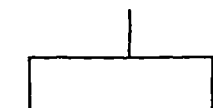
_ please specify : _____

2. Do you think that time/ time plus other factors/ others is a fair basis for determining audit fee?

Time

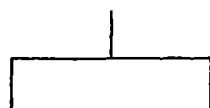
Time plus other factors

others



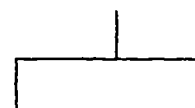
Yes

No

☐
☐


Yes

No

☐
☐


Yes

No

☐
☐

3. How important are the following factors (size, complexity and others) in determining the level of audit fees?

3.A SIZE FACTORS:

	very imp.	imp.	unimp.
A.1 - Turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.2 - Trading profit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.3 - Profit before tax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.4 - Stocks & work in progress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.5 - Debtors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.6 - Total assets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.7 - Current liabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.8 - Creditors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.9 - Loan capital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.10 - Share capital & reserves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.11 - Number of employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.12 - Employment costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.13 - Others (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please list the 4 most important "size factors" (1 being the most important and 2 the second important and so on).

(1) Factor No. _____ (3) Factor No. _____
 (2) Factor No. _____ (4) Factor No. _____

In your opinion, how does the company size affect the audit fee?

Large company

- Higher fee ()
- Lower fee ()
- No effect ()

Small company

- Higher fee ()
- Lower fee ()
- No effect ()

3.B COMPLEXITY FACTORS:

	very imp.	imp.	unimp.
B.1 - No. of principal subsidiaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.2 - No. of countries in which the company operates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.3 - No. of product lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.4 - Location of plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.5 - Nature of company's business (financial, industrial, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.6 - Type of industry (chemical, electrical, etc.).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.7 - Degree of centralization of financial control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.8 - Degree of computerization of accounting records	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.9 - Others, (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please list the 4 most important "complexity factors" (1 being
the most important and 2 the second important and so on).

(1) Factor No. _____

(3) Factor No. _____

(2) Factor No. _____

(4) Factor No. _____

3.C OTHER FACTORS:

		very imp.	imp.	unimp.
C.1 The high quality of internal control system		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()				
- Lower fee ()				
- No effect ()				
C.2 The competition in the market for audit services		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()				
- Lower fee ()				
- No effect ()				
c.3 The probability of obtaining non-audit work such as accounting, taxation, or management consultancy services		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()				
- Lower fee ()				
- No effect ()				
C.4 The date of company's year end		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>"Busy period"</u>	<u>"Less busy period"</u>			
<u>January - June</u>	<u>July - December</u>			
- Higher fee ()	-Higher fee ()			
- Lower fee ()	-Lower fee ()			
- No effect ()	-No effect ()			
C.5 The continuity of client		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>"Continuing client"</u>	<u>"Changing client"</u>			
- Higher fee ()	-Higher fee ()			
- Lower fee ()	-Lower fee ()			
- No effect ()	-No effect ()			
C.6 The size of audit firm		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>"Biq 10"</u>	<u>"Non Biq 10"</u>			
- Higher fee ()	-Higher fee ()			
- Lower fee ()	-Lower fee ()			
- No effect ()	-No effect ()			
C.7 The good reputation of audit firm		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Higher fee ()				
- Lower fee ()				
- No effect ()				

C.8 The risk which the auditor accepts ☐ ☐ ☐

- Higher fee ()
- Lower fee ()
- No effect ()

C.9 The good reputation of company ☐ ☐ ☐

- Higher fee ()
- Lower fee ()
- No effect ()

C.10 Others, (please specify) ☐ ☐ ☐

Please list the 4 most important 'other factors' (1 being the most important and 2 the second important and so on).

(1) Factor No. _____

(3) Factor No. _____

(2) Factor No. _____

(4) Factor No. _____

*The Big 10:

1. Arthur Andersen

6. Grant Thornton

2. Arthur Young

7. KMG Thomson McIntock

3. Coopers & Lybrand

8. Peat Marwick, Michell & Co.

4. Deloitte Haskins & Sells

9. Price Waterhouse

5. Ernst & whinney

10. Touche Ross

Thank you for your assistance. If you would like information about the results of this research, please indicate the name and address to whom the results should be sent:

Department of accountancy and finance
 Heriot-Watt University
 31-35 The Grassmarket
 EDINBURGH
 EH1 2HT

APPENDIX (3)

SUMMARY OF THE RESPONSES TO COMPANIES' QUESTIONNAIRE

" THE DETERMINANTS OF AUDIT FEES "

Please indicate by ticking the appropriate box:

1. Does the fee as stated in your annual report represent:

- Audit fee alone?..... 90.5%

or

- Audit fee plus other factors, such as accounting, taxation or
management consultancy services? 7.5%

- No answer..... 2%

2. Did you change your audit firm during the past 3 years?

Yes
9.5%

No
88.5%

No answer
2%

If yes please indicate which year and the main reason for that :

1983
0

1984
2 Cos.

1985
3 Cos.

Because of being taken over / to reduce costs / to improve the level of
the services / because the consolidation of audit under one firm capable
of providing comprehensive and quality financial services worldwide
would be better than a number of joint auditors.

3. In your opinion, do you think your company's audit fee when compared
with the size and complexity of the company is:

High?
17%

reasonable
79%

Low
0

No answer
4%

If it is high, what do you think could be done to hold it down?

-Improving the quality of the internal control system..... ☐

-Others, please specify

Co-operation both by the company and the external auditor in terms
of using effective internal audit staff, and better external audit

planning and control / increasing pressure on audit managers to minimize costs.

4. Is your company's annual audit fee determined by :

- Time spent by auditor and audit staff?..... 77%

or

- Time plus other factors?..... 21%

such as: Complexity of the operations / Skills and experience of audit staff / Market pressure / Quality of company's internal control system / Previous fees / Risk and responsibility involved in the audit work / Development of audit techniques and progress

or

- Others? please specify

Negotiating the fee with the auditor..... 2%

5. Do you think that time/time plus other factors/others is a fair basis for determining an audit fee?

Time		Time plus other factors		Others		No response
Yes	No	Yes	No	Yes	No	
53%	0	43%	0	2%	0	2%

6. Is your company's audit firm one of the Big 10* (see page 6)?

Yes
91%

No
9%

If yes, what are the main advantages of having your company audited by a Big audit firm?

- Quality guarantee
- Worldwide services
- Prestige

If no, do you think that the annual audit requirements could be satisfied by any qualified auditor working in a small audit firm?

Yes

No

☐
☐

If yes, what are the reasons for that? _____

7. How important are the following factors (size, complexity and others) in affecting the amount of audit work and consequently the level of audit fee?

7.A SIZE FACTORS:

The size factors are listed in order according to their importance (i.e., number of occurrences that each factor was selected as one of the 4 most important):

A.1 - Stocks & work in progress	38
A.2 - Turnover	33
A.3 - Total assets	27
A.4 - Debtors	17
A.5 - Creditors	15
A.6 - Profit before tax	14
A.7 - Trading profit	14
A.8 - Current liabilities	12
A.9 - Share capital & reserves	9
A.10 - Number of employees	6
A.11 - Employment costs	3
A.12 - Loan capital	3
A.13 - Others (please specify)	

The size of the company's tax bill..... 2

In your opinion, how does the company size affect the audit fee?

<u>Large company</u>		<u>Small company</u>	
- Higher fee	51%	- Higher fee	38%
- Lower fee	36%	- Lower fee	45%
- No effect	10%	- No effect	13%
- No answer	3%	- No answer	4%

7.B COMPLEXITY FACTORS:

The complexity factors are listed in order according to their importance (i.e., number of occurrences that each factor was selected as one of the 4 most important):

B.1 - No. of countries in which the company operates	44
B.2 - No. of principal subsidiaries	40
B.3 - Degree of centralization of financial control	30
B.4 - Degree of computerization of accounting records	27
B.5 - Nature of company's business (financial, industrial, etc.).....	19
B.6 - Type of industry (chemical, electrical, etc.).....	10
B.7 - No. of product lines	10
B.8 - Location of plants	8
B.9 - Others, (please specify)	
Changing in company's structure	1
Complexity of transactions.....	1

7.C OTHER FACTORS:

The 'other factors' are listed in order according to their importance (i.e., number of occurrences that each factor was selected as one of the 4 most important), and their impact on the level of audit fees.:

C.1 The high quality of internal control system..... 39

- Higher fee 1
- Lower fee 42
- No effect 2

C.2 The continuity of audit firm 25

"Continuing audit firm"

- Higher fee 3
- Lower fee 25
- No effect 16

"Changing audit firm"

- Higher fee 15
- Lower fee 6
- No effect 9

C.3 The good reputation of audit firm 23

- Higher fee 28
- Lower fee 0
- No effect 13

C.4 The good reputation of company.... 21

- Higher fee 5
- Lower fee 18
- No effect 17

C.5 The competition in the market for audit services 17

- Higher fee 1
- Lower fee 31
- No effect 11

C.6 The risk which the auditor accepts 14

- Higher fee 22
- Lower fee 0
- No effect 20

C.7 The need for non-audit work such as accounting, taxation, or management consultancy services..... 9

- Higher fee 7
- Lower fee 8
- No effect 25

C.8 The date of company's year end 5

"Busy period"

January - June

- Higher fee 8
- Lower fee 4
- No effect 25

"Less busy period"

July - December

- Higher fee 6
- Lower fee 7
- No effect 22

C.9 Others, (please specify)

Level of bargaining power..... 1

Competition for highly qualified accountants 1

The Big 10:

1. Arthur Andersen

6. Grant Thornton

2. Arthur Young

7. KMG Thomson McIntock

3. Coopers & Lybrand

8. Peat Marwick, Mitchell & Co.

4. Deloitte Haskins & Sells

9. Price Waterhouse

5. Ernst & whinney

10. Touche Ross

APPENDIX (4)

SUMMARY OF THE RESPONSES TO AUDIT FIRMS' QUESTIONNAIRE

"THE DETERMINANTS OF AUDIT FEES"

Please indicate by ticking the appropriate box:

1. Is the annual audit fee determined by :

- Time spent by auditor and audit staff?..... 35%

or

- Time plus other factors?..... 65%

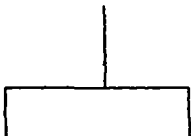

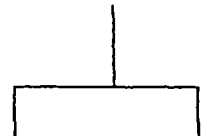
such as: The risk involved in the audit work / complexity of the
engagement / competition in the audit market / probability of
obtaining non audit work / skills & experience of audit staff
ability of client to pay / degree of responsibility

or

- Others..... 0

_ please specify : _____

2. Do you think that time/ time plus other factors/ others is a fair basis for determining audit fee?

Time		Time plus other factors		others	
					
Yes	No	Yes	No	Yes	No
22%	0	78%	0	0	0

3. How important are the following factors (size, complexity and others) in determining the level of audit fees?

3.A SIZE FACTORS:

The size factors are listed in order according to their importance (i.e., number of occurrences that each factor was selected as one of the 4 most important):

A.1 - Turnover	16
A.2 - Stocks & work in progress	13
A.3 - Debtors	8
A.4 - Total assets	7
A.5 - Creditors	6
A.6 - Trading profit	5
A.7 - Current liabilities	4
A.8 - Profit before tax	4
A.9 - Share capital & reserves	3
A.10 - Loan capital	2
A.11 - Number of employees	1
A.12 - Employment costs	1
A.13 - Others (please specify)	
Size of company's transactions	1

In your opinion, how does the company size affect the audit fee?

Large company

– Higher fee 39%
 – Lower fee 13%
 – No effect 44%
 – No answer 4%

Small company

– Higher fee 17%
 – Lower fee 35%
 – No effect 44%
 – No answer 4%

3.8 COMPLEXITY FACTORS:

The complexity factors are listed in order according to their importance (i.e., number of occurrences that each factor was selected as one of the 4 most important):

B.1 - No. of principal subsidiaries	14
B.2 - No. of countries in which the company operates	13
B.3 - Degree of computerization of accounting records	12
B.4 - Degree of centralization of financial control	11
B.5 - Nature of company's business (financial, industrial, etc.).....	7
B.6 - Location of plants	5
B.7 - No. of product lines	4
B.8 - Type of industry (chemical, electrical, etc.)	4
B.9 - Others, (please specify)	

3.C 'OTHER FACTORS':

The 'other factors' are listed in order according to their importance (i.e., number of occurrences that each factor was selected as one of the 4 most important), and their impact on the level of audit fees:

C.1 The high quality of internal control system.....	14
- Higher fee	0
- Lower fee	15
- No effect	4
C.2 The probability of obtaining non-audit work such as accounting, taxation, or management consultancy services	11
- Higher fee	0
- Lower fee	11
- No effect	10
C.3 The risk which the auditor accepts	9
- Higher fee	16
- Lower fee	0
- No effect	4
C.4 The continuity of client	6
<u>"Continuing client"</u>	<u>"Changing client"</u>
- Higher fee	0
- Lower fee	7
- No effect	16
- Higher fee	10
- Lower fee	3
- No effect	8
C.5 The competition in the market for audit services	4
- Higher fee	0
- Lower fee	10
- No effect	10
C.6 The date of company's year end	3
<u>"Busy period"</u>	<u>"Less busy period"</u>
<u>January - June</u>	<u>July - December</u>
- Higher fee	5
- Lower fee	0
- No effect	14
- Higher fee	0
- Lower fee	6
- No effect	13

C.7 The good reputation of the company 3

- Higher fee 3
- Lower fee 2
- No effect 14

C.8 The size of audit firm 2

"Big 10"

"Non Big 10"

- | | |
|-----------------|----------------|
| - Higher fee 10 | - Higher fee 0 |
| - Lower fee 0 | - Lower fee 9 |
| - No effect 5 | - No effect 7 |

C.9 The good reputation of audit firm 2

- Higher fee 7
- Lower fee 0
- No effect 12

C.10 Others, (please specify)

*The Big 10:

- | | |
|-----------------------------|---------------------------------|
| 1. Arthur Andersen | 6. Grant Thornton |
| 2. Arthur Young | 7. KMG Thomson McIntock |
| 3. Coopers & Lybrand | 8. Peat Marwick, Mitchell & Co. |
| 4. Deloitte Haskins & Sells | 9. Price Waterhouse |
| 5. Ernst & whinney | 10. Touche Ross |

APPENDIX (5)

THE STEPWISE REGRESSION PROCEDURE

STEPWISE REGRESSION PROCEDURE

There are several procedures can be used for determining the best predictors of the dependent variables. The most frequently used procedures are: forward selection, backward elimination, and stepwisewise regression.

Stepwise regression is probably the most commonly used procedure in regression. The criterion of selecting the most significant variables is determined by the partial correlation coefficient and the F value.

Stepwise procedure is really a combination of backward and forward procedures (Norusis1983)⁷⁰, as it uses the forward selection procedure in entering the variables into the equation according to the F - to - enter criterion FIN i.e., the minimum value of F statistic that a variable must achieve in order to enter the equation, whereas the backward elimination is used for removing variables from the equation according to the F - to - remove criterion FOUT i.e., the minimum F value that a variable must have in order to remain in the equation.

The first subsequent regression analysis in chapter 6 was also conducted (with the two principal component size and complexity as independent variables) using both the forward selection and backward elimination procedures. The results obtained were similar to those using the stepwise regression procedure, i.e., both size and complexity are significant determinants of audit fees, and the size factor is more significant than the complexity factor.

APPENDIX (6)

SOME IMPORTANT STATISTICAL MEASURES

SOME IMPORTANT STATISTICAL MEASURES

1. The R^2 value:

Which is also known as the coefficient of determination. It is the square root of multiple R (the correlation coefficient between a set of independent variables X's and the dependent variable Y. It measures the degree of the association between the dependent and independent variables). R^2 is a commonly used measure of the goodness of fit of a linear model. "It measures the proportion of the variation of the criterion (dependent) variable about its mean which is explained by the predictor (independent) variable(s), Hair 1979³².

R square compares the sum of squared errors explained by regression with the total sum of squared errors and is given by the following fraction:

$$R^2 = \frac{\text{Sum of squared errors explained by regression } SS_{\text{reg}}}{\text{Total sum of squared errors } SS_{\text{t}}}$$

The value of R square varies between 0 and 1; the higher the value of R square the more linear the regression model. R square can also be thought of as the square of the correlation coefficient between y the observed value of the dependent variable, and \hat{y} the predicted value of y from the fitted line, Norusis 1983⁷⁰.

2. The adjusted R²:

The adjusted R² value is more reliable measure of goodness of fit of the model in the population than R² value. The sample R² value tends to be an optimistic estimate of how well the model fits the population. The model usually does not fit the population as well as it fits the sample from which it was derived. The statistic adjusted R² attempts to correct R² to more closely related the goodness of fit of the model in the population.

$$\text{Adjusted } R^2 = R^2 - \frac{P(1-R^2)}{N-K-1 \text{ or (Degree of freedom)}}$$

Where:

N = Number of the observations in the sample

K = Number of the independent variables in the equation.

3. The standard error of the estimate (S_e):

It is a useful measure of the dispersion around the multiple regression plane. The standard error can be calculated as the square root of the unexplained sum of squared residual divided by degrees of freedom (N-K-1) as given in the following equation:

$$S_e = \sqrt{\text{Sum of squared errors (residual)} / N-K-1}$$

Or it could be given by:

$$S_e = \sqrt{\text{Mean square of residual}}$$

Because of the way the standard error is computed (by calculating the individual errors $y - \hat{y}$ in the fitted regression plane, squaring them, computing their mean, and dividing by degree of freedom) it is sometimes called the root mean square error or root S_e, Richard Levin 1987⁷⁴.

APPENDIX (7)

SOME IMPORTANT STATISTICAL TESTS

SOME IMPORTANT STATISTICAL TESTS:

The F test:

The test for the population $R^2 = 0$ (F test) can be obtained from the analysis of variance, where the variability in the dependent variable (Total sum of squares is divided into two components: the explained variance or sum of squares explained by regression SS_{reg} , and the unexplained variance or sum of squares residual SS_{res}).

Each of these sums of squares has an associated number of degrees of freedom; SS_{reg} has K degrees of freedom because there are K independent variables being used to explain y, whereas SS_{res} has N-K-1 degrees of freedom, because we used our own n observations to estimate K+1 constants a, b_1, b_2, \dots, b_K , Richard Levin 1987⁷⁴.

The F test can be performed by calculating the computed F statistic as given by:

$$F = \frac{SS_{reg} / d.f}{SS_{res} / d.f} \quad \text{or}$$

$$F = \frac{SS_{reg} / K}{SS_{res} / N-K-1} \quad \text{or}$$

$$F = \frac{\text{Mean square regression}}{\text{Mean square residual}}$$

If the computed F statistic exceeds the value at 5% level of significant then the null hypothesis H_0 can be rejected and one can conclude that the regression model as a whole is significant. The observed significant level (Signif. F) is less than 0.0005, Norusis 1983⁷⁰.